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United States Coast Pilot 6

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Great Lakes:
Lakes Ontario, Erie, Huron, Michigan, and Superior and St. Lawrence River

April 1986

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service

C55. 422:

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United States Coast Pilot 6

Great Lakes: Lakes Ontario, Erie, Huron, Michigan, and Superior and St. Lawrence River

April 1986

BEARINGS ARE TRUE AND DISTANCES ARE EXPRESSED IN STATUTE MILES

Corrected through:
Local Notices to Mariners issued by Coast Guard District Commanders, December 20, 1985.

Notice to Mariners published by Defense Mapping Agency Hydrographic/Topographic Center, No. 47, November 23, 1985.
Canadian Notice to Mariners, No. 43, October 1985

Next edition about April 1987

U.S. DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary
National Oceanic and Atmospheric Administration
Anthony J. Calio, Administrator
National Ocean Service
Paul M. Wolff, Assistant Administrator

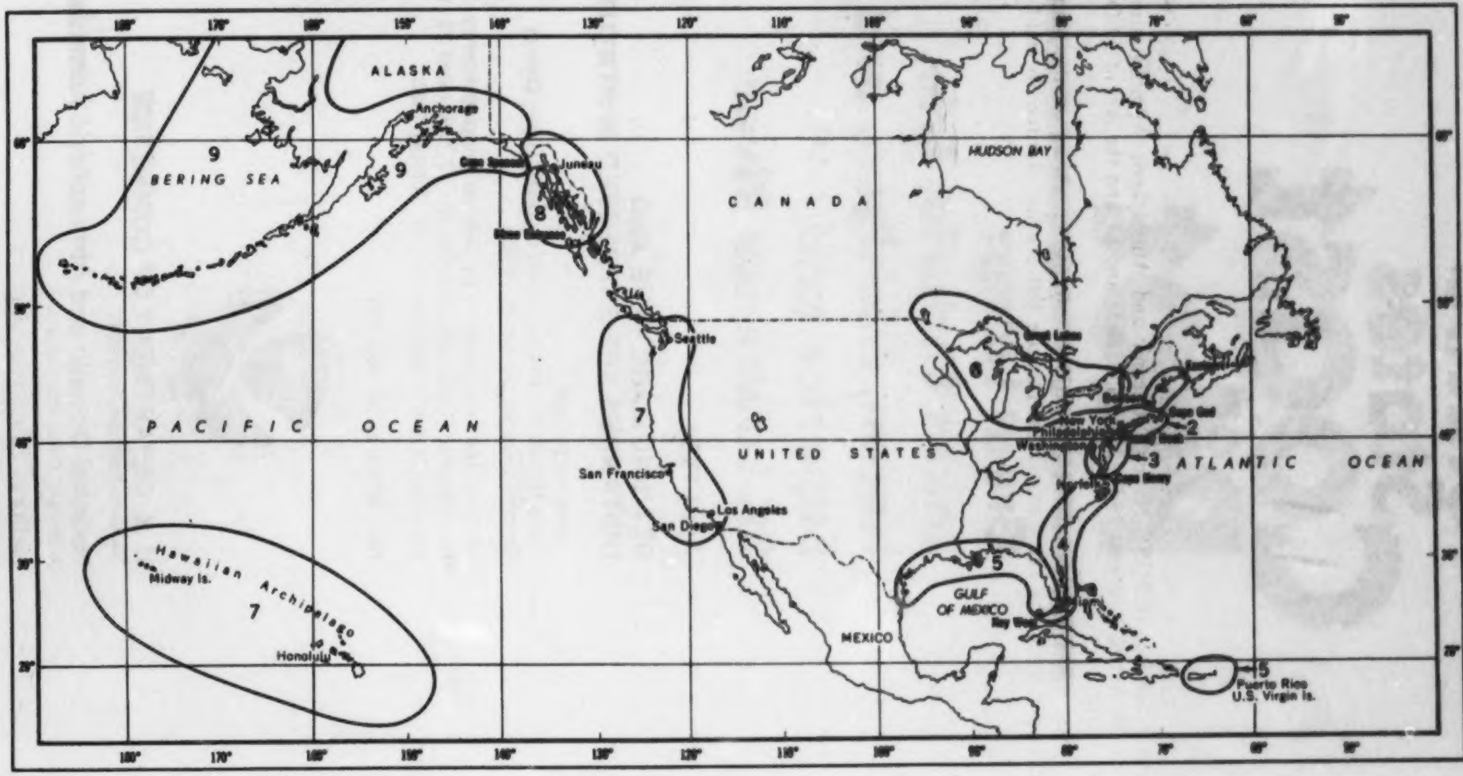
Washington, D.C.: 1986
For sale by the National Ocean Service and its sales agents.

LIMITS OF UNITED STATES COAST PILOTS

Atlantic Coast
1 Eastport to Cape Cod
2 Cape Cod to Sandy Hook
3 Sandy Hook to Cape Henry
4 Cape Henry to Key West
5 Gulf of Mexico, Puerto Rico, and Virgin Islands

Pacific Coast
7 California, Oregon, Washington, and Hawaii
8 Alaska - - Dixon Entrance to Cape Spencer
9 Alaska - - Cape Spencer to Beaufort Sea

Great Lakes
6 The Lakes and their Connecting Waterways



Preface

United States Coast Pilots are published by the National Ocean Service (NOS), Charting and Geodetic Services (C&GS), National Oceanic and Atmospheric Administration (NOAA), pursuant to the Act of 6 August 1947 (33 U.S.C. 883a and b), and the Act of 22 October 1968 (44 U.S.C. 1310).

The Coast Pilots supplement the navigational information shown on the nautical charts. The sources for updating the Coast Pilot include but are not limited to field inspections conducted by NOAA, information published in Notices to Mariners, reports from NOAA hydrographic vessels and field parties, information from other Government agencies, State and local governments, Canadian Government, maritime and pilotage associations, port authorities and mariners.

This volume of Coast Pilot 6, Great Lakes, Lakes Ontario, Erie, Huron, Michigan, and Superior and St. Lawrence River, cancels the 1985 edition.

Caution: The Coast Pilot is corrected through the dates of Notices to Mariners shown on the title page and should not be used without reference to the Notices to Mariners issued subsequent to those dates.

Mariners and others are urged to report promptly to the National Ocean Service errors, omissions, or any conditions found to differ from or to be additional to those published in the Coast Pilot or shown on the charts in order that they may be fully investigated and proper corrections made. A Coast Pilot Report form is included in the back of this book and a Marine Information Report form is published in the Defense Mapping Agency Hydrographic/Topographic Center Notice to Mariners for your convenience. These reports and/or suggestions for increasing the usefulness of the Coast Pilot should be sent to Director, Charting and Geodetic Services (N/CG223), National Ocean Service, NOAA, Rockville, MD 20852.

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1. GENERAL INFORMATION

UNITED STATES COAST PILOTS.–The National Ocean Service Coast Pilots are a series of nine nautical books that cover a wide variety of information important to navigators of U.S. coastal and intracoastal waters, and the waters of the Great Lakes. Most of this book information cannot be shown graphically on the standard nautical charts and is not readily available elsewhere. The subjects in the Coast Pilot include, but are not limited to, channel descriptions, anchorages, bridge and cable clearances, currents, tide and water levels, prominent features, pilotage, towage, weather, ice conditions, wharf descriptions, dangers, routes, traffic separation schemes, small-craft facilities, and Federal regulations applicable to navigation.

Caution.–The Coast Pilot is corrected through the dates of Notices to Mariners shown on the title page and should not be used without reference to the Notices to Mariners issued subsequent to those dates. Changes to the Coast Pilot that affect the safety of navigation and are reported to NOS in the interim period between new editions are published in the Local and Weekly Notices to Mariners.

Bearings.–These are true and are expressed in degrees from 000° (north) to 359°, measured clockwise. General bearings are expressed by initial letters of the points of the compass (e.g., N, NNE, NE, etc.). Adjective and adverb endings, except in chapter 2, Navigation Regulations, have been discarded. Wherever precise bearings are intended degrees are used. Light-sector bearings are toward the light.

Bridges and Cables.–Vertical clearances of bridges and overhead cables are in feet above Low Water Datum unless otherwise stated. When the water level is above Low Water Datum, the bridge and overhead cable clearances given in this Coast Pilot and shown on the charts should be reduced accordingly. Clearances of drawbridges are for the closed position, although the open clearances are also given for vertical-lift bridges. Clearances given in the Coast Pilots are those approved for nautical charting, and are supplied by the U.S. Coast Guard (bridges) and U.S. Army Corps of Engineers (cables); they may be as-built (verified by actual inspection after completion of structures) or authorized (design values specified in permit issued prior to construction). No differentiation is made in the Coast Pilots between as-built and authorized clearances. (See charts for horizontal clearances of bridges, as these are given in the Coast Pilots only when they are less than 50 feet.) Submarine cables are rarely mentioned.

Cable ferries.–Cable ferries are guided by cables fastened to shore and sometimes propelled by a cable rig attached to the shore. Generally, the cables are suspended during crossings and dropped to the bottom when the ferries dock. Where specific operating procedures are known they are mentioned in the text. Since operating procedures vary, mariners are advised to exercise extreme caution and seek local knowledge. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

Courses.–These are true and are given in degrees clockwise from 000° (north) to 359°. The courses given are the courses to be made good.

Currents.–Stated current velocities are the averages at strength. Velocities are in knots, which are nautical miles per hour, or in statute miles per hour. Directions are the true directions to which the currents set.

Depths.–Depths are the distances in units of the charts (feet, meters, or fathoms), from the Chart Datum to the bottom. (See Chart Datum this chapter for further detail.) The **controlling depth** of a channel is the least depth within the limits of the channel; it restricts the safe use of the channel to drafts of less than that depth. The **centerline controlling depth** of a channel applies only to the channel centerline; lesser depths may exist in the remainder of the channel. The **midchannel controlling depth** of a channel is the controlling depth of only the middle half of the channel. **Federal project depth** is the design dredging depth of a channel constructed by the Corps of Engineers, U.S. Army; the project depth may or may not be the goal of maintenance dredging after completion of the channel, and, for this reason, project depth must not be confused with controlling depth. **Depths alongside wharves** usually have been reported by owners and/or operators of the waterfront facilities, and have not been verified by Government surveys; since these depths may be subject to change, local authorities should be consulted for the latest controlling depths.

In general, the Coast Pilots give the project depths for deep-draft ship channels maintained by the Corps of Engineers. The latest controlling depths are usually shown on the charts and published in the Notices to Mariners. For other channels, the latest controlling depths available at the time of publication are given. **In all cases, however, mariners are advised to consult with pilots, port and local authorities, and Federal and State authorities for the latest channel controlling depths.**

Under-keel clearances.–It is becoming increasingly evident that economic pressures are causing mariners to navigate through waters of barely adequate depth, with under-keel clearances being finely assessed from the charted depths, predicted water levels, and depths recorded by echo sounders.

It cannot be too strongly emphasized that even charts based on modern surveys may not show all submerged obstructions or the shoalest depths, and actual water levels may be appreciably lower than those predicted.

In many ships an appreciable correction must be applied to shoal soundings recorded by echo sounders due to the horizontal distance between the transducers. This separation correction, which is the amount by which recorded depths therefore exceed true depths, increases with decreasing depths to a maximum equal to half the distance apart of the transducers; at this maximum the transducers are aground. Ships whose transducers are more than 6 feet apart should construct a table of true and recorded depths using the Traverse Tables. (Refer to discussion of echo soundings elsewhere in chapter 1.)

Other appreciable corrections, which must be applied by many ships, are for settlement and squat. These corrections depend on the depth of water below the keel, the hull form, and speed of the ship.

Settlement causes the water level around the ship to be lower than would otherwise be the case. It will always cause echo soundings to be less than they would otherwise be. Settlement is appreciable when the depth is less than seven times the draft of the ship, and increases as the depth decreases and the speed increases.

Squat denotes a change in trim of a ship underway, relative to her trim when stopped. It usually causes the stern of a vessel to sit deeper in the water. However, it is reported that in the case of mammoth ships squat causes the bow to sit deeper. Depending on the location of the echo sounding transducers, this may cause the recorded depth to be greater or less than it ought to be.

Distances.–These are in statute miles unless otherwise stated. A statute mile is 5,280 feet, 1,760 yards, or about 0.87 nautical mile.

Heights.–These are in feet above the chart datum used for that purpose on the charts, usually Low Water Datum.

Light and fog signal characteristics.–These are not described, and light sectors and visible ranges are normally not defined. (See United States and Canadian Coast Guard Light Lists.)

Obstructions.–Wrecks and other obstructions are mentioned only if of a relatively permanent nature and in or near normal traffic routes.

Potable Water Intakes are shown on NOS charts of the Great Lakes and connecting waters with the symbol PWI. Potable water intakes are not generally mentioned in the Coast Pilot. (See Potable Water Intakes, chapter 3, and **21 CFR 1250.93**, chapter 2.)

Radio aids to navigation.–These are seldom described. (See United States and Canadian Coast Guard Light Lists and Defense Mapping Agency Hydrographic/Topographic Center and Canadian Coast Guard Radio Navigational Aids publications.)

Ranges.–These are not fully described. "**A 339° Range**" means that the rear structure bears 339° from the front structure. (See United States and Canadian Coast Guard Light Lists.)

Reported information.–Information received by NOS from various sources concerning depths, dangers, currents, facilities, and other subjects, which has not been verified by Government surveys or inspections, is often included in Coast Pilots; such **unverified information** is qualified as "reported", and should be regarded with caution.

Time.–Unless otherwise stated, all times are given in local standard time in the 24-hour system. (Noon is 1200, 2:00 p.m. is 1400, and midnight is 0000.)

Winds.–Directions are the true directions from which the winds blow. Unless otherwise indicated, speeds are given in statute miles per hour.

NOTICES TO MARINERS

Notices to Mariners are published by Federal agencies to advise operators of vessels of marine information affecting the safety of navigation. The notices include changes in aids to navigation, depths in channels, bridge and overhead cable clearances, reported dangers, and other useful marine information. They should be used routinely for updating the latest editions of nautical charts and related publications.

Local Notice to Mariners is issued by each Coast Guard District Commander for the waters under his jurisdiction. (See appendix for Coast Guard districts covered by this volume.) These notices are usually published weekly and may be obtained without cost by making application to the appropriate District Commander.

Notice to Mariners, published weekly by the Defense Mapping Agency Hydrographic/Topographic Center, is prepared jointly with NOS and the Coast Guard. These notices contain selected items from the Local Notices to Mariners and other reported marine information required by deep-draft vessels operating in both **foreign** and **domestic** waters. Special items, covering a variety of subjects and generally not discussed in the Coast Pilot or shown on nautical charts, are published annually in Notice to Mariners No. 1. These items are important to the mariner and should be read for future reference. The weekly notices may be obtained by operators of deep-draft vessels, without cost, by making application to Defense Mapping Agency Office of Distribution Services. (See appendix for address.)

Notices and reports of **improved channel depths** are also published by district offices of the Corps of Engineers, U.S. Army. (See appendix for districts covered by this volume.) Although information from these notices/reports affecting NOS charts and related publications is usually published in the Notices to Mariners, the local district engineer office should be consulted where depth information is critical.

Marine Broadcast Notices to Mariners are made by the Coast Guard through Coast Guard, Navy, and some commercial radio stations to report deficiencies and important changes in aids to navigation. (See Radio Warnings and Weather, this chapter.)

Vessels operating within the limits of the Coast Guard districts can obtain information affecting NOS charts and related publications from the Local Notices to Mariners. Small craft using the Intracoastal Waterway and other waterways and small harbors within the United States that are not normally used by deep-draft vessels will require the Local Notices to Mariners to keep charts and related publications up-to-date. Information for deep-draft vessels can be obtained from the Notice to Mariners published by the Defense Mapping Agency Hydrographic/Topographic Center.

Notices to Mariners may be consulted at Coast Guard district offices, NOS offices, Defense Mapping Agency Hydrographic/Topographic Center offices and depots, most local marine facilities, and sales agents handling charts and related publications.

U.S. GOVERNMENT AGENCIES PROVIDING MARITIME SERVICES

National Ocean Service (NOS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce.–The National Ocean Service provides charts and related publications for the safe navigation of marine and air commerce, and provides basic data for engineering and scientific purposes and for other commercial and industrial needs. The principal facilities of NOS are located in Rockville, Md.; in Norfolk, Va. (Atlantic Marine Center); and in Seattle, Wash. (Pacific Marine Center). NOAA ships are based at the marine centers. These offices maintain files of charts and other publications which are available for the use of the mariners, who are invited to avail themselves of the facilities afforded. (See appendix for addresses.)

Sales agents for Charts, Coast Pilots, Tide Tables, Tidal Current Tables, Tidal Current Diagrams, Tidal Current Charts, Hydrographs of Lake Levels, and Great Lakes Water Levels of the National Ocean Service are located in many U.S. ports and in some foreign ports. A list of authorized sales agents and chart catalogs may be had free upon request from National Ocean Service, Distribution Branch (N/CG33). (See appendix for address.)

Nautical charts are published primarily for the use of the mariner, but serve the public interest in many other ways. They are compiled principally from NOS basic field surveys, supplemented by data from other Government organizations.

Coast Guard, Department of Transportation.–The Coast Guard has among its duties the enforcement of the laws of the United States on the high seas and in coastal and inland waters of the U.S. and its possessions; enforcement of navigation and neutrality laws and regulations; establishment and enforcement of navigational regulations upon the Inland Waters of the United States, including the establishment of a demarcation line separating the high seas from waters upon which U.S. navigation rules apply; administration of the Oil Pollution Act of 1961, as amended; establishment and administration of vessel anchorages; approval of bridge locations and clearances over navigable waters; administration of the alteration of obstructive bridges; regulation of drawbridge operations; inspection of vessels of the Merchant Marine; admeasurement of vessels; documentation of vessels; preparation and publication of merchant vessel registers; registration of stack insignia; port security; issuance of Merchant Marine licenses and documents; search and rescue operations; investigation of marine casualties and accidents, and suspension and revocation proceedings; destruction of derelicts; operation of aids to navigation; publication of Light Lists and Local Notices to Mariners; and operation of ice-breaking facilities.

The Coast Guard, with the cooperation of coast radio stations of many nations, operates the **Automated Mutual-assistance Vessel Rescue System** (AMVER). It is an international maritime mutual assistance program which provides important aid to the development and coordination of search and rescue (SAR) efforts in many offshore areas of the world. Merchant ships of all nations making offshore passages are encouraged to voluntarily send movement (sailing) reports and periodic position reports to the AMVER Center at Coast Guard New York via selected radio stations. Information from these reports is entered into an electronic computer which generates and maintains dead reckoning positions for the vessels. Characteristics of vessels which are valuable for determining SAR capability are also entered into the computer from available sources of information.

A worldwide communications network of radio stations supports the AMVER System. Propagation conditions, location of vessel, and traffic density will normally determine which station may best be contacted to establish communications. To ensure that no charge is applied, all AMVER reports should be passed through specified radio stations. Those stations which currently accept AMVER reports and apply no coastal station, ship station, or landline charge are listed in each issue of the "AMVER Bulletin" publication. Also listed are the respective International radio call signs, locations, frequency bands, and hours of operation. The "AMVER Bulletin" is available from Commander Atlantic Area (Ast), U.S. Coast Guard, AMVER Center, Governors Island, New York, N.Y. 10004. Although AMVER reports may be sent through nonparticipating stations, the Coast Guard cannot reimburse the sender for any charges applied.

Information concerning the predicted location and SAR characteristics of each vessel known to be within the area of interest is made available upon request to recognized SAR agencies of any nation or vessels needing assistance. Predicted locations are only disclosed for reasons related to marine safety.

Benefits of AMVER participation to shipping include: (1) improved chances of aid in emergencies, (2) reduced number of calls for assistance to vessels not favorably located, and (3) reduced time lost for vessels responding to calls for assistance. An AMVER participant is under no greater obligation to render assistance during an emergency than a vessel who is not participating.

All AMVER messages should be addressed to **Coast Guard New York** regardless of the station to which the message is delivered, except those sent to Canadian stations which should be addressed to **AMVER Halifax** or **AMVER Vancouver** to avoid incurring charges to the vessel for these messages.

Instructions guiding participation in the AMVER System are available in the following languages: Chinese, Danish, Dutch, English, French, German, Greek, Italian, Japanese, Korean, Norwegian, Portuguese, Polish, Russian, Spanish, and Swedish. The AMVER Users Manual is available from: Commander, Atlantic Area, U.S. Coast Guard, Governors Island, N.Y. 10004; Commander, Pacific Area, U.S. Coast Guard, Government Island, Alameda, Calif. 94501; and at U.S. Coast Guard District Offices, Marine Safety Offices, Marine Inspection Offices, and Captain of the Port Offices in major U.S. ports. Requests for instructions should state the language desired if other than English.

For AMVER participants bound for U.S. ports there is an additional benefit. AMVER participation via messages which include the necessary information is considered to meet the requirements of 33 CFR 160. (See **33 CFR 160.201**, chapter 2, for rules and regulations.)

AMVER ReportingRequired–U.S. Maritime Administration regulations effective August 1, 1983, state that certain U.S. flag vessels and foreign flag "War Risk" vessels must report and regularly update their voyages to the AMVER Center. This reporting is required of the following: (a) U.S. flag vessels of 1,000 gross tons or greater, operating in foreign commerce; (b) foreign flag vessels of 1,000 gross tons or greater, for which an Interim War Risk Insurance Binder has been issued under the provisions of Title XII, Merchant Marine Act, 1936.

Details of the above procedures are contained in the AMVER Users Manual. The system is also published in DMAHTC Pubs. 117A and 117B.

Search and Rescue Operation procedures are contained in the International Maritime Organization (IMO) SAR Manual (MERSAR). U.S. flag vessels may obtain a copy of MERSAR from local Coast Guard Marine Safety Offices and Marine Inspection Offices or by writing to U.S. Coast Guard (G-OSR), Washington, D.C. 20593. Other flag vessels may purchase MERSAR directly from IMO.

The Coast Guard conducts and/or coordinates **search and rescue** operations for surface vessels and aircraft that are in distress or overdue. (See Distress Signals and Communication Procedures this chapter.)

Light Lists, published by the Coast Guard, describe aids to navigation, consisting of lights, fog signals, buoys, lightships, daybeacons, and electronic aids, in United States (including Puerto Rico and U.S. Virgin Islands) and contiguous Canadian waters. Light Lists are for sale by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, and by sales agents in the principal seaports. Mariners should refer to these publications for detailed information regarding the characteristics and visibility of lights, and the descriptions of light structures, lightships, buoys, fog signals, and electronic aids.

Documentation (issuance of certificates of registry, enrollments, and licenses), admeasurements of vessels, and administration of the various navigation laws pertaining thereto are functions of the Coast Guard. Yacht commissions are also issued, and certain undocumented vessels required to be numbered by the Federal Boat Safety Act of 1971 are numbered either by the Coast Guard or by a State having an approved numbering system (the latter is most common). Owners of vessels may obtain the necessary information from any Coast Guard District Commander, Marine Safety Office, or Marine Inspection Office. Coast Guard District Offices, Coast Guard Stations, Marine Safety Offices, Captain of the Port Offices, Marine Inspection Offices, and Documentation Offices are listed in the appendix. (Note: A Marine Safety Office performs the same functions as those of a Captain of the Port and a Marine Inspection Office. When a function is at a different address than the Marine Safety Office, it will be listed separately in the appendix.)

Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC), Department of Defense.–The Defense Mapping Agency Hydrographic/Topographic Center provides hydrographic, navigational, topographic, and geodetic data, charts, maps, and related products and services to the Armed Forces, other Federal agencies, the Merchant Marine and mariners in general. Publications include Sailing Directions (pilots), Light Lists, Distances Between Ports, Radio Navigational Aids, International Code of Signals, American Practical Navigator (Bowditch), and the Notice to Mariners published weekly. Sales of all DMAHTC products are handled by the Defense Mapping Agency Office of Distribution Services. (See appendix for address.)

Corps of Engineers, Department of the Army.–The Corps of Engineers has charge of the improvement of the rivers and harbors of the United States and of miscellaneous other civil works which include the administration of certain Federal laws enacted for the protection and preservation of navigable waters of the United States; the establishment of regulations for the use, administration, and navigation of navigable waters; the establishment of harbor lines; the removal of sunken vessels obstructing or endangering navigation; and the granting of permits for structures or operations in navigable waters, and for discharges and deposits of dredged and fill materials in these waters.

Information concerning the various ports, improvements, channel depths, navigable water, and the condition of the Intracoastal Waterways in the areas under their jurisdiction may be obtained direct from the District Engineer Offices. (See appendix for addresses.)

Restricted areas in most places are defined and regulations governing them are established by the Corps of Engineers. The regulations are enforced by the authority designated in the regulations, and the areas are shown on the large-scale charts of NOS. Copies of the regulations may be obtained at the District offices of the Corps of Engineers. The regulations are also included in the appropriate Coast Pilots.

Fishtraps.–The Corps of Engineers has general supervision of location, construction, and manner of maintenance of all traps, weirs, pounds, or other fishing structures in the navigable waters of the United States. Where State and/or local controls are sufficient to regulate these structures, including that they do not interfere with navigation, the Corps of Engineers leaves such regulation to the State or local authority. See 33 CFR 330 (not carried in this Pilot) for applicable Federal regulations. Construction permits issued by the Engineers specify the lights and signals required for the safety of navigation.

Fish havens, artificial reefs constructed to attract fish, can be established in U.S. coastal waters only as authorized by a Corps of Engineers permit; the permit specifies the location, extent, and depth over these "underwater junk piles".

National Weather Service (NWS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce.–The National Weather Service provides marine weather forecasts and warnings for the U.S. coastal waters, the Great Lakes, offshore waters, and high seas areas. Scheduled marine forecasts are issued four times daily from more than 20 **National Weather Service Forecast Offices (WSFO's)** around the country, operating 24 hours a day. Marine services are also provided by over 50 **National Weather Service Offices** with local areas of responsibility. (See appendix for Weather Service Forecast Offices and Weather Service Offices for the area covered by this Coast Pilot.)

Typically, the forecasts contain information on wind speed and direction, wave heights, visibility, weather, and a general synopsis of weather patterns affecting the region. The forecasts are supplemented with special marine warnings and statements, radar summaries, marine observations, small-craft advisories, gale warnings, storm warnings and various categories of tropical cyclone warnings e.g., tropical depression, tropical storm and hurricane warnings. Specialized products such as coastal flood, seiche, and tsunami warnings, heavy surf advisories, low-water statements, ice forecasts and outlooks, and lakeshore warnings and statements are issued as necessary.

The principal means of disseminating marine weather services and products in the coastal areas is **NOAA Weather Radio.** This network of more than 350 stations nationwide is operated by the NWS and provides continuous broadcasts of weather information for the general public. (See Radio Navigation Warnings and Weather, this chapter.)

Marine weather warnings are displayed to small-craft operators and others within sight of the shore by the flags, pennants, and lights of the **Coastal Warning Display** program. This means of receiving marine warnings is the least efficient because of the limited visual range of the display and problems in hoisting and lowering the display promptly. The Coastal Warning Display program is being de-emphasized as small-boat operators and coastal residents are urged to rely instead on low-cost portable NOAA Weather Radio receivers.

NWS marine weather products are also disseminated to marine users through the broadcast facilities of the Coast Guard, Navy, National Bureau of Standards, National Marine Fisheries Service, certain Sea Grant Universities, and commercial marine radio stations. Details on these broadcasts including times, frequencies, and broadcast content are listed in the joint NWS/Navy publication Selected Worldwide Marine Weather Broadcasts. For marine weather services in the coastal areas, the NWS publishes a series of Marine Weather Services Charts showing locations of NOAA Weather Radio stations, Coastal Warning Display sites, telephone numbers of recorded weather messages and NWS offices, and other useful marine weather information.

Ships of all nations share equally in the effort to report weather observations. These reports enable meteorologists to create a detailed picture of wind, wave, and weather patterns over the open waters that no other data source can provide and upon which marine forecasts are based. The effectiveness and reliability of these forecasts and warnings plus other services to the marine community are strongly linked to the observations received from mariners. There is an especially urgent need for ship observations in the coastal waters, and the NWS asks that these be made and transmitted whenever possible. Many storms originate and intensify in coastal areas. There may be a great difference in both wind direction and speed between the open sea, the offshore waters, and on the coast itself.

Information on how ships, commercial fishermen, offshore industries, and others in the coastal zone may participate in the marine observation program is available from **National Weather Service Port Meteorological Officers (PMO's).** Port Meteorological Officers are located in major U.S. port cities and the Republic of Panama, where they visit ships in port to assist masters and mates with the weather observation program, provide instruction on the interpretation of weather charts, calibrate barometers and other meteorological instruments, and discuss marine weather communications and marine weather requirements affecting the ships' operations. (See appendix for addresses of Port Meteorological Officers in or near the area covered by this Coast Pilot.)

National Environmental Satellite, Data, and Information Service (NESDIS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce.–Among its functions, NESDIS archives, processes, and disseminates the non-realtime meteorological and oceanographic data collected by Government agencies and private institutions. Marine weather observations are collected from ships at sea on a voluntary basis. About one million observations are received annually at NESDIS's National Climatic Center. They come from vessels representing every maritime nation. These observations, along with land data, are returned to the mariners in the form of climatological summaries and atlases for coastal and ocean areas. They are available in such NOAA publications as the **U.S. Coast Pilots, Mariners Weather Log,** and **Local Climatological Data, Annual Summary.** They also appear in the Defense Mapping Agency Hydrographic/Topographic Center's **Pilot Charts and Sailing Directions Planning Guides.**

Environmental Protection Agency (EPA).–The U.S. Environmental Protection Agency provides coordinated governmental action to assure the protection of the environment by abating and controlling pollution on a systematic basis. The ocean dumping permit program of the Environmental Protection Agency provides that, except when authorized by permit, the dumping of any material into the ocean is prohibited by the "Marine Protection, Research and Sanctuaries Act of 1972, Public Law 92-532," as amended (33 USC 1401 et seq.).

Permits for the **dumping of dredged material** into waters of the United States, including the territorial sea, and into ocean waters are issued by the Corps of Engineers. Permits for the dumping of fill material into waters of the United States, including the territorial sea, are also issued by the Corps of Engineers. Permits for the dumping of other material in the territorial sea and ocean waters are issued by the Environmental Protection Agency.

Corps of Engineers regulations relating to the above are contained in 33 CFR 323-324; Environmental Protection Agency regulations are in 40 CFR 220-229. (See Dump Sites this chapter.)

Persons or organizations who want to file for an application for an ocean dumping permit should write the Environmental Protection Agency Regional Office for the region in which the port of departure is located. (See appendix for addresses of regional offices and States in the EPA coastal regions.)

The letter should contain the name and address of the applicant; name and address of person or firm; the name and usual location of the conveyance to be used in the transportation and dumping of the material involved; a physical description where appropriate; and the quantity to be dumped and proposed dumping site.

Everyone who writes EPA will be sent information about a final application for a permit as soon as possible. This final application is expected to include questions about the description of the process or activity giving rise to the production of the dumping material; information on past activities of applicant or others with respect to the disposal of the type of material involved; and a description about available alternative means of disposal of the material with explanations about why an alternative is thought by the applicant to be inappropriate.

Federal Communications Commission.–The Federal Communications Commission controls non-Government radio communications in the United States, Guam, Puerto Rico, and the Virgin Islands. Commission inspectors have authority to board ships to determine whether their radio stations comply with international treaties, Federal Laws, and Commission regulations. The commission has field offices in the principal U.S. ports. (See appendix for addresses.) Information concerning ship radio regulations and service documents may be obtained from the Federal Communications Commission, Washington, D.C. 20554, or from any of the field offices.

Customs Service, Department of the Treasury.–The U.S. Customs Service administers certain laws relating to: entry and clearance of vessels and permits for certain vessel movements between points in the United States; prohibitions against coastwise transportation of passengers and merchandise; salvage, dredging and towing by foreign vessels; certain activities of vessels in the fishing trade; regular and special tonnage taxes on vessels; the landing and delivery of foreign merchandise (including unlading, appraisement, lighterage, drayage, warehousing, and shipment in bond); collection of customs duties, including duty on imported pleasure boats and yachts and 50% duty on foreign repairs to American vessels engaged in trade; customs treatment of sea and ship's stores while in port and the baggage of crewmen and passengers; illegally imported merchandise; and remission of penalties or forfeiture if customs or navigation laws have been violated. The Customs Service also cooperates with many other Federal agencies in the enforcement of statutes they are responsible for. Customs districts and ports of entry, including customs stations, are listed in the appendix.

The Customs Service may issue, without charge, a **cruising license,** valid for a period of up to 6 months and for designated U.S. waters, to a yacht of a foreign country which has a reciprocal agreement with the United States. A foreign yacht holding a cruising license may cruise in the designated U.S. waters and arrive at and depart from U.S. ports without entering or clearing at the customhouse, filing manifests, or obtaining or delivering permits to proceed, provided it does not engage in trade or violate the laws of the United States or visit a vessel not yet inspected by a Customs Agent and does, within 24 hours of arrival at each port or place in the United States, report the fact of arrival to the nearest customhouse. Countries which have reciprocal agreements granting these privileges to United States yachts are Argentina, Australia, Bahama Islands, Bermuda, Canada, Federal Republic of Germany, Great Britain, Greece, Honduras, Jamaica, Liberia, the Netherlands, and New Zealand. Further information concerning cruising licenses may be obtained from the headquarters port for the customs district in which the license is desired. U.S. yacht owners planning cruises to foreign ports may contact the nearest customs district headquarters as to customs requirements.

Immigration and Naturalization Service, Department of Justice.–The Immigration and Naturalization Service administers the laws relating to admission, exclusion, and deportation of aliens, the registration and fingerprinting of aliens, and the naturalization of aliens lawfully resident in the United States.

The designated ports of entry for aliens are divided into three classes. Class A is for all aliens. Class B is only for aliens who at the time of applying for admission are lawfully in possession of valid resident aliens' border-crossing identification cards or valid nonresident aliens' border-crossing identification cards or are admissible without documents under the documentary waivers contained in 8 CFR 212.1(a). Class C is only for aliens who are arriving in the United States as crewmen as that term is defined in Section 101(a) (10) of the Immigration and Nationality Act. (The term "crewman" means a person serving in any capacity on board a vessel or aircraft.) No person may enter the United States until he has been inspected by an immigration officer. A list of the offices covered by this Coast Pilot is given in the appendix.

Animal and Plant Health Inspection Service, Department of Agriculture.–The Agricultural Quarantine Inspection Program and Animal Health Programs of this organization are responsible for protecting the Nation's animal population, food and fiber crops, and forests from invasion by foreign pests. They administer agricultural quarantine and restrictive orders issued under authority provided in various acts of Congress. The regulations prohibit or restrict the importation or interstate movements of live animals, meats, animal products, plants, plant products, soil, injurious insects, and associated items that may introduce or spread plant pests and animal diseases which may be new to or not widely distributed within the United States or its territories. Inspectors examine imports at ports of entry as well as the vessel, its stores, and crew or passenger baggage.

The Service also provides an inspection and certification service for exporters to assist them in meeting the quarantine requirements of foreign countries. (See appendix for a list of ports where agricultural inspectors are located and inspections conducted.)

Public Health Service, Department of Health and Human Services.–The Public Health Service administers foreign quarantine procedures at U.S. ports of entry.

All vessels arriving in the United States are subject to public health inspection. Vessels subject to routine boarding for quarantine inspection are only those which have had on board during the 15 days preceding the date of expected arrival or during the period since departure (whichever period of time is shorter) the occurrence of any death or ill person among passengers or crew (including those who have disembarked or have been removed). The master of a vessel must report such occurrences immediately by radio to the quarantine station at or nearest the port at which the vessel will arrive.

In addition, the master of a vessel carrying 13 or more passengers must report by radio 24 hours before arrival the number of cases (including zero) of diarrhea in passengers and crew recorded in the ship's medical log during the current cruise. All cases that occur after the 24 hour report must also be reported not less than 4 hours before arrival.

"Ill person" means person who:

1. Has a temperature of 100°F (or 38°C) or greater, accompanied by a rash, glandular swelling, or jaundice, or which has persisted for more than 48 hours; or

2. Has diarrhea, defined as the occurrence in a 24 hour period of three or more loose stools or of a greater than normal (for the person) amount of loose stools.

Vessels arriving at ports under control of the United States are subject to sanitary inspection to determine whether measures should be applied to prevent the introduction, transmission, or spread of communicable disease.

Specific public health laws, regulations, policies, and procedures may be obtained by contacting U.S. Quarantine Stations, U.S. Consulates or the Chief Program Operations, Division of Quarantine, Centers for Disease Control, Atlanta, Ga, 30333. (See appendix for addresses of U.S. Public Health Service Quarantine Stations.)

Food and Drug Administration (FDA), Public Health Service, Department of Health and Human Services.–Under the provisions of the Control of Communicable Diseases Regulations (21 CFR 1240) and Interstate Conveyance Sanitation Regulations (21 CFR 1250), vessel companies operating in interstate traffic shall obtain potable water for drinking and culinary purposes only at watering points found acceptable to the Food and Drug Administration. Water supplies used in watering point operations must also be inspected to determine compliance with applicable Interstate Quarantine Regulations (42 CFR 72). These regulations are based on authority contained in the Public Health Service Act (PL 78-410). Penalties for violation of any regulation prescribed under authority of the Act are provided for under Section 368 (42 USC 271) of the Act.

FDA publishes a list of **Acceptable Vessel Watering Points** as of January 1 each year. This list is available from most FDA offices or from Interstate Travel Sanitation Subprogram, FDA, HFF-312, 200 C Street SW., Washington, D.C. 20204. Since the acceptability of watering points may have changed since January 1, their current status must be obtained by contacting any FDA office. (See appendix for addresses.)

Foreign-Trade Zones, Foreign-Trade Zones Board.–U.S. foreign-trade zones are enclosed areas considered outside the Customs territory of the United States. They are the U.S. version of what are known internationally as free trade zones and are located in or near U.S. Customs ports of entry. Operated as public utilities by qualified corporations, zones function under Customs supervision. Authority for establishing these facilities is granted by the Foreign-Trade Zones Board, a Federal interagency body chaired by the Secretary of Commerce, within whose Department the Board's executive secretariat is situated.

Foreign and domestic merchandise may be moved into zones for operations not otherwise prohibited by law involving storage, exhibition, assembly, manufacture, or other processing. The usual formal Customs entry procedure and payment of duties is not required on the foreign merchandise unless and until it enters Customs territory for domestic consumption, in which case the importer has a choice of paying duties either on the original foreign materials or the finished product. Quota restrictions do not normally apply to foreign goods in zones. Domestic goods moved into a zone for export are considered exported upon entering the zone for purposes of excise tax rebates and drawback. (See appendix for addresses of Foreign-Trade Zones covered by this Coast Pilot.)

DISTRESS SIGNALS AND COMMUNICATION PROCEDURES

Coast Guard search and rescue operations.–The Coast Guard conducts and/or coordinates search and rescue operations for surface vessels or aircraft that are in distress or overdue. Search and Rescue vessels and aircraft have special markings, including a wide slash of red-orange and a small slash of blue on the forward portion of the hull or fuselage. Other parts of aircraft, normally painted white, may have other areas painted red to facilitate observation. The cooperation of vessel operators with Coast Guard helicopters, fixed-wing aircraft, and vessels may mean the difference between life and death for some seaman or aviator; such cooperation is greatly facilitated by the prior knowledge on the part of vessel operators of the operational requirements of Coast Guard equipment and personnel, of the international distress signals and procedures, and of good seamanship.

International distress signals.–(1) A signal made by radiotelegraphy or by any other signaling method consisting of the group "SOS" in Morse Code.

(2) A signal sent by radiotelephony consisting of the spoken word "MAYDAY."

(3) The International Flag Code Signal of NC.

(4) A signal consisting of a square flag having above or below it a ball or anything resembling a ball.

(5) Flames on the craft (as from a burning oil barrel, etc.).

(6) A rocket parachute flare or hand flare showing a red light.

(7) Rockets or shells, throwing red stars fired one at a time at short intervals.

(8) Orange smoke, as emitted from a distress flare.

(9) Slowly and repeatedly raising and lowering arms outstretched to each side.

(10) A gun or other explosive signal fired at intervals of about 1 minute.

(11) A continuous sounding of any fog-signal apparatus.

(12) The radiotelegraph alarm signal.

(13) The radiotelephone alarm signal.

(14) Signals transmitted by emergency position-indicating radiobeacons.

(15) A piece of orange-colored canvas with either a black square and circle or other appropriate symbol (for identification from the air).

(16) A dye marker.

Radio distress procedures.–Distress calls in the Great Lakes are made on channel 16 (156.80 MHz) VHF-FM (MAYDAY) for radiotelephony. For less serious situations than warrant the distress procedure, the urgency signal PAN (PAHN, spoken three times) or the safety signal SECURITY (SAY-CURI-TAY, spoken three times) are used as appropriate. For complete information on emergency radio procedures, see 47 CFR 83 or DMAHTC Pubs. 117A or 117B. **(See appendix for a list of Coast Guard Stations which guard 156.80 MHz.)** Complete information on distress guards can be obtained from Coast Guard District Commanders.

Distress calls indicate a vessel or aircraft is threatened by grave and imminent danger and requests immediate assistance. They have absolute priority over all other transmissions. All stations which hear a distress call must immediately cease any transmission capable of interfering with the distress traffic and shall continue to listen on the frequency used for the emission of the distress call. This call shall not be addressed to a particular station, and acknowledgement of receipt shall not be given before the distress message which follows it is sent.

Radiotelephone distress communications include the following actions:

(1) The **radiotelephone alarm signal** (if available): The signal consists of two audio tones, of different pitch, transmitted alternately; its purpose is to attract the attention of persons on radio watch or to actuate automatic alarm devices. It may only be used to announce that a distress call or message is about to follow.

(2) The **distress call,** consisting of:

the distress signal MAYDAY (spoken three times);

the words THIS IS (spoken once);

the call sign or name of the vessel in distress (spoken three times).

(3) The **distress message** follows immediately and consists of:

the distress signal MAYDAY;

the call sign and name of the vessel in distress;

particulars of its position (latitude and longitude, or true bearing and distance from a known geographical position);
the nature of the distress;
the kind of assistance desired;
the number of persons aboard and the condition of any injured;
present seaworthiness of vessel;
description of the vessel (length; type; cabin; masts; power; color of hull, superstructure, trim; etc.);
any other information which might facilitate the rescue, such as display of a surface-to-air identification signal or a radar reflector;
your listening frequency and schedule;
THIS IS (call sign and name of vessel in distress).
OVER.

(4) **Acknowledgement of receipt of a distress message:** If a distress message is received from a vessel which is definitely in your vicinity, immediately acknowledge receipt. If it is not in your vicinity, allow a short interval of time to elapse before acknowledging, in order to permit vessels nearer to the vessel in distress to acknowledge receipt without interference. However, in areas where reliable communications with one or more shore stations are practicable, all vessels may defer this acknowledgement for a short interval so that a shore station may acknowledge receipt first. The acknowledgement of receipt of a distress is given as follows:
the call sign or name of the vessel sending the distress (spoken three times);
the words THIS IS;
the call sign or name of acknowledging vessel (spoken three times);
The words RECEIVED MAYDAY.

After the above acknowledgement, allow a momentary interval of listening to ensure that you will not interfere with another vessel better situated to render immediate assistance; if not, with the authority of the person in charge of the vessel, transmit:
the word MAYDAY:
the call sign and name of distressed vessel;
the words THIS IS;
the call sign and name of your vessel;
your position (latitude and longitude, or true bearing and distance from a known geographical position);
the speed you are proceeding towards, and the approximate time it will take to reach, the distressed vessel. OVER

(5) **Further distress messages and other communications:** Distress communications consist of all messages relating to the immediate assistance required by the distressed vessel. Each distress communication shall be preceded by the signal MAYDAY. The vessel in distress or the station in control of distress communications may **impose silence** on any station which interferes. The procedure is: the words SEELONCE MAYDAY (Seelonce is French for silence). Silence also may be imposed by nearby mobile stations other than the vessel in distress or the station in control of distress communications. The mobile station which believes that silence is essential may request silence by the following procedure: the word SEELONCE, followed by the word DISTRESS, and its own call sign.

(6) **Transmission of the distress procedure by a vessel or shore station not itself in distress:** A vessel or a shore station which learns that a vessel is in distress shall transmit a distress message in any of the following cases:

(a) **When the vessel in distress is not itself able to transmit the distress message.**

(b) When a vessel or a shore station considers that further help is necessary.

(c) When, although not in a position to render assistance, it has heard a distress message that has not been acknowledged.

In these cases, the transmission shall consist of:
the radiotelephone alarm signal (if available);
the words MAYDAY RELAY (spoken three times);
the words THIS IS;
the call sign and name of vessel (or shore station), spoken three times.

When a vessel transmits a distress under these conditions, it shall take all necessary steps to contact the Coast Guard or a shore station which can notify the Coast Guard.

(7) **Termination of distress:** When distress traffic has ceased, or when silence is no longer necessary on the frequency used for the distress traffic, the station in control shall transmit on that frequency a message to all stations as follows:
the distress signal MAYDAY;
the call TO ALL STATIONS, spoken three times;
the words THIS IS;
the call sign and name of the station sending the message;
the time;
the name and call sign of the vessel in distress;
the words SEELONCE FEENEE (French for silence finished).

DISTRESS ASSISTANCE AND COORDINATION PROCEDURES

Surface ship procedures for assisting distressed surface vessels.

(1) The following immediate action should be taken by each ship on receipt of a distress message:

(a) Acknowledge receipt and, if appropriate, transmit the distress message;

(b) Immediately try to take D/F bearings during the transmission of the distress message and maintain a D/F watch on 500 kHz and/or 2182 kHz;

(c) Communicate the following information to the ship in distress:
(i) identity;
(ii) position;
(iii) speed and estimated time of arrival (ETA);
(iv) when available, true bearing of the ship in distress.

(d) Maintain a continuous listening watch on the frequency used for the distress. This will normally be VHF-FM channel 16 (156.80 MHz).

(e) Operate radar continuously;

(f) If in the vicinity of the distress, post extra lookouts.

(2) The following action should be taken when proceeding to the area of distress:

(a) Plot the position, course, speed, and ETA of other assisting ships;

(b) Know the communication equipment with which other ships are fitted. This information may be obtained from the International Telecommunication Union's List of Ship Stations;

(c) Attempt to construct an accurate "picture" of the circumstances attending the casualty. The important information needed is included under Distress Signals and Communication Procedures, this chapter. Should the ship in distress fail to transmit this information, a ship proceeding to assist should request what information is needed.

(3) The following on-board preparation while proceeding to the distress area should be considered:

(a) A rope (guest warp) running from bow to quarter at the waterline on each side and secured by lizards to the ship's side to assist boats and rafts to secure alongside;

(b) A derrick rigged ready for hoisting on each side of the ship with a platform cargo sling, or rope net, secured to the runner to assist the speedy recovery of exhausted or injured survivors in the water;

(c) Heaving lines, ladders, and scramble net placed ready for use along both sides of the ship on the lowest open deck and possibly crew members suitably equipped to enter the water and assist survivors;

(d) A ship's liferaft made ready for possible use as a boarding station;

(e) Preparations to receive survivors who require medical assistance including the provision of stretchers;

(f) When own lifeboat is to be launched, any means to provide communications between it and the parent ship will prove to be of very great help;

(g) A line throwing appliance with a light line and a heavy rope, ready to be used for making connection either with the ship in distress or with survival craft.

Aircraft procedures for directing surface craft to scene of distress incident.–The following procedures performed in sequence by an aircraft mean that the aircraft is directing a surface craft toward the scene of a distress incident,

(a) Circling the surface craft at least once.

(b) Crossing the projected course of the surface craft close ahead at low altitude, rocking the wings, opening and closing the throttle, or changing the propeller pitch.

(c) Heading in the direction in which the surface craft is to be directed. The surface craft should acknowledge the signal by changing course and following the aircraft. If, for any reason, it is impossible to follow, the surface craft should hoist the international code flag NOVEMBER, or use any other signaling means available to indicate this.

The following procedures performed by an aircraft mean that the assistance of the surface craft is no longer required:

(a) Crossing the wake of the surface craft close astern at a low altitude, rocking the wings, opening and closing the throttle or changing the propeller pitch.

Since modern jet-engined aircraft cannot make the characteristic sound associated with opening and closing the throttle, or changing propeller pitch, ships should be alert to respond to the signals without the sounds, when jets or turboprop aircraft are involved.

Surface ship procedures for assisting aircraft in distress.–1. When an aircraft transmits a distress message by radio, the first transmission is generally made on the designated air/ground en route frequency in use at the time between the aircraft and aeronautical station. The aircraft may change to another frequency, possibly another en route frequency or the aeronautical emergency frequencies of 121.50 MHz or 243 MHz. In an emergency, it may use any other available frequency to establish contact with any land, mobile, or direction-finding station.

2. There is liaison between Coast Radio Stations aeronautical units, and land-based search and rescue organizations. Merchant ships will ordinarily be informed of aircraft casualties at sea by broadcast messages from Coast Radio Stations, made on the international distress frequency of 156.80 MHz (VHF-FM channel 16). Ships may, however, become aware of the casualty by receiving a message from the aircraft in distress or a SAR aircraft.

3. For the purpose of emergency communications with aircraft, special attention is called to the possibility of conducting direct communications on 2182 kHz, if both ship and aircraft are so equipped.

4. An aircraft in distress will use any means at its disposal to attract attention, make known its position, and obtain help, including some of the signals prescribed by the applicable Navigation Rules.

5. Aircraft usually sink quickly (i.e., within a few minutes). Every endeavor will be made to give ships an accurate position of an aircraft which desires to ditch. When given such a position, a ship should at once consult any other ships in the vicinity on the best procedure to be adopted. The ship going to the rescue should answer the station sending the broadcast and give her identity, position, and intended action.

6. If a ship should receive a distress message direct from an aircraft, she should act as indicated in the immediately preceding paragraph and also relay the message to the nearest Coast Radio Station. Moreover, a ship which has received a distress message direct from an aircraft and is going to the rescue should take a bearing on the transmission and inform the Coast Radio Station and other ships in the vicinity of the call sign of the distressed aircraft and the time at which the distress message was

received, followed by the bearing and time at which the signal ceased.

7. When an aircraft decides to ditch in the vicinity of a ship, the ship should:

(a) Transmit homing bearings to the aircraft, or (if so required) transmit signals enabling the aircraft to take its own bearings.

(b) By day, make black smoke.

(c) By night, direct a searchlight vertically and turn on all deck lights. Care must be taken not to direct a searchlight toward the aircraft, which might dazzle the pilot.

8. Ditching an aircraft is difficult and dangerous. A ship which knows that an aircraft intends to ditch should be prepared to give the pilot the following information:

(a) Wind direction and force.

(b) Direction, height, and length of primary and secondary swell systems.

(c) Other pertinent weather information.

The pilot of an aircraft will choose his own ditching heading. If this is known by the ship, she should set course parallel to the ditching heading. Otherwise the ship should set course parallel to the main swell system and into the wind component, if any.

9. A land plane may break up immediately on striking the water, and liferafts may be damaged. The ship, should, therefore, have a lifeboat ready for launching, and if possible, boarding nets should be lowered from the ship and heaving lines made ready in the ship and the lifeboat. Survivors of the aircraft may have bright colored lifejackets and location aids.

10. The method of recovering survivors must be left to the judgment of the master of the ship carrying out the rescue operation.

11. It should be borne in mind that military aircraft are often fitted with ejection seat mechanisms. Normally, their aircrew will use their ejection seats, rather than ditch. Should such an aircraft ditch, rather than the aircrew bail out, and it becomes necessary to remove them from their ejection seats while still in the aircraft, care should be taken to avoid triggering off the seat mechanisms. The activating handles are invariably indicated by red and or black/yellow coloring.

12. A survivor from an aircraft casualty who is recovered may be able to give information which will assist in the rescue of other survivors. Masters are therefore asked to put the following questions to survivors and to communicate the answers to a Coast Radio Station. They should also give the position of the rescuing ship and the time when the survivors were recovered.

(a) What was the time and date of the casualty?

(b) Did you bail out or was the aircraft ditched?

(c) If you bailed out, at what altitude?

(d) How many others did you see leave the aircraft by parachute?

(e) How many ditched with the aircraft?

(f) How many did you see leave the aircraft after ditching?

(g) How many survivors did you see in the water?

(h) What flotation gear had they?

(i) What was the total number of persons aboard the aircraft prior to the accident?

(j) What caused the emergency?

Helicopter evacuation of personnel.–Helicopter evacuation, usually performed by the Coast Guard, is a hazardous operation to the patient and to the flight crew, and should only be attempted in event of very serious illness or injury. Provide the doctor on shore with all the information you can concerning the patient, including age, current condition, pulse, blood pressure, respiration rate, and any known medical history, so that an intelligent evaluation can be made concerning the need for evacuation. Most rescue helicopters can proceed less than 150 miles offshore (a few new helicopters can travel 250 to 300 miles out to sea), dependent on weather conditions and other variables. If an evacuation is necessary, the vessel must be prepared to proceed within range of the helicopter, and should be familiar with the preparations which are necessary prior to and after its arrival.

When requesting helicopter assistance:

(1) Give the accurate position, time, speed, course, weather conditions, sea conditions, wind direction and velocity, type of vessel, and voice and CW frequency for your ship.

(2) If not already provided, give complete medical information including whether or not the patient is ambulatory.

(3) If you are beyond helicopter range, advise your diversion intentions so that a rendezvous point may be selected.

(4) If there are changes to any items reported earlier, advise the rescue agency immediately. Should the patient die before the arrival of the helicopter, be sure to advise those assisting you.

Preparations prior to the arrival of the helicopter:

(1) Provide continuous radio guard on VHF-FM channel 16 (156.80 MHz).

(2) Select and clear the most suitable hoist area, preferably aft on the vessel with a minimum of 50 feet radius of clear deck. This must include the securing of loose gear, awnings, and antenna wires. Trice up running rigging and booms. If hoist is aft, lower the flag staff.

(3) If the hoist is to take place at night, light the pickup areas as well as possible. Be sure you do not shine any lights on the helicopter, so that the pilot is not blinded. If there are any obstructions in the vicinity, put a light on them so the pilot will be aware of their positions.

(4) Point searchlights vertically to aid the flight crew in locating the ship and turn them off when the helicopter is on the scene.

(5) Be sure to advise the helicopter of the location of the pickup area on the ship before the helicopter arrives, so that the pilot may make his approach to aft, amidships, or forward, as required.

(6) There will be a high noise level under the helicopter, so voice communications on deck are

almost impossible. Arrange a set of hand signals among the crew who will assist.

Hoist operations:

(1) If possible, have the patient moved to a position as close to the hoist area as his condition will permit-**time is important.**

(2) Normally, if a litter (stretcher) is required, it will be necessary to move the patient to the special litter which will be lowered by the helicopter. Be prepared to do this as quickly as possible. Be sure the patient is strapped in, face up, and with a life jacket on (if his condition will permit).

(3) Be sure that the patient is tagged to indicate what medication, if any, was administered to him and when it was administered.

(4) Have patient's medical record and necessary papers in an envelope or package ready for transfer with the patient.

(5) Again, if the patient's condition permits, be sure he is wearing a life jacket.

(6) Change the vessel's course to permit the ship to ride as easily as possible with the wind on the bow, preferably on the port bow. Try to choose a course to keep the stack gases clear of the hoist area. Once established, maintain course and speed.

(7) Reduce speed to ease ship's motion, but maintain steerageway.

(8) If you do not have radio contact with the helicopter, when you are in all respects ready for the hoist, signal the helicopter in with a "come on" with your hand, or at night by flashlight signals.

(9) **Allow basket or stretcher to touch deck prior to handling to avoid static shock.**

(10) If a trail line is dropped by the helicopter, guide the basket or stretcher to the deck with the line; keep the line free at all times. This line will not cause shock.

(11) Place the patient in basket, sitting with his hands clear of the sides, or in the litter, as described above. Signal the helicopter hoist operator when ready for the hoist. Patient should signal by a nodding of the head if he is able. Deck personnel give thumbs up.

(12) If it is necessary to take the litter away from the hoist point, unhook the hoist cable and keep it free for the helicopter to haul in. **Do not secure cable or tail line to the vessel or attempt to move stretcher without unhooking.**

(13) When patient is strapped into the stretcher, signal the helicopter to lower the cable, attach cable to stretcher sling (bridle), then signal the hoist operator when the patient is ready to hoist. Steady the stretcher so it will not swing or turn.

(14) If a trail line is attached to the basket or stretcher, use it to steady the patient as he is hoisted. Keep your feet clear of the line, and keep the line from becoming entangled.

Medical advice and/or evacuation.–In the event a master of a vessel requires medical advice and/or there is a potential of evacuation the following should be volunteered by master:

Vessel's name and call sign.
Vessel's position and time at position.
Vessel's course, speed and next port and estimated time of arrival (ETA).
Patient's name, nationality, age, race and sex.
Patient's respiration, pulse and temperature.
Patient's symptoms and nature of illness.
Any known history of similar illness.
Location and type of pain.
Medical supplies carried on board vessel.
Medication given to patient.
Weather.
Communication schedule and frequency.

Coast Guard droppable, floatable pumps.–The Coast Guard often provides vessels in distress with emergency pumps by either making parachute drops, by lowering on helicopter hoist, or by delivering by vessel. The most commonly used type of pump comes complete in a sealed aluminum drum about half the size of a 50-gallon oil drum. One single lever on top opens it up. Don't be smoking as there may be gas fumes inside the can. The pump will draw about 90 gallons per minute. There should be a waterproof flashlight on top of the pump for night use. Operating instructions are provided inside the pump container.

Preparations for being towed by Coast Guard:

(1) Clear the forecastle area as well as you can.

(2) If a line-throwing gun is used, keep everyone out of the way until line clears the boat. The Coast Guard vessel will blow a police whistle or otherwise warn you before firing.

(3) Have material ready for chafing gear.

Radar reflectors on small craft.–Operators of disabled wooden or fiberglass craft and persons adrift in rubber rafts or boats that are, or may consider themselves to be, the object of a search, should hoist on a halyard or otherwise place aloft as high as possible any irregularly shaped metallic object that would assist their detection by radar. The more irregular the shape, the better will be the radar reflective quality. Coast Guard cutters and aircraft are radar equipped and thus are able to continue searching in darkness and during other periods of low visibility. To assist in identification during periods of low visibility, shine spotlights straight up, being careful not to blind the crew when aircraft are involved. It is advisable for coastal fishing boats, yachts, and other small craft to have efficient radar reflectors permanently installed aboard the vessel.

Filing Cruising schedules.–Small-craft operators should prepare a cruising plan before starting on extended trips and leave it ashore with a yacht club, marina, friend, or relative. It is advisable to use a checking-in procedure by telephone for each point specified in the cruising plan. Such a trip schedule is vital for determining if a boat is overdue and will assist materially in locating a missing craft in the event search and rescue operations become necessary.

Search and Rescue Telephone Number.–The United States Coast Guard has established a toll-free search and rescue telephone number for the Great Lakes. The number is intended for use when the telephone number of the nearest Coast Guard station is unknown, or when that station cannot be contacted. The toll-free number should not be used without first attempting to contact the nearest Coast Guard station. In all Great Lakes States, except Ohio, the telephone number is 800-321-4400; in Ohio the telephone number is 800-362-1033. These numbers are to be used for search and rescue only.

RADIO NAVIGATION WARNINGS AND WEATHER

Marine radio warnings and weather forecasts are disseminated by many sources and through several types of transmissions. Only voice radiotelephone broadcasts are described in the Coast Pilots. Radiotelegraph (CW), radioteletype, radiofacsimile, and CW broadcasts of navigational warnings and other advisories are not described, since these transmissions are normally copied only by professional radio operators. (For complete information on radio warnings and weather, see DMAHTC Pubs. 117A, 117B, and the joint National Weather Service/Navy publication, Selected Worldwide Marine Weather Broadcasts.)

Frequency units.–Hertz (Hz), a unit equal to one cycle per second, has been generally adopted for radio frequencies; accordingly, frequencies formerly given in the Coast Pilots in kilocycles (kc) and megacycles (mc) are now stated in **kilohertz (kHz)** and **Megahertz (MHz)**, respectively.

Coast Guard radio stations.–Urgent, safety, and scheduled marine information broadcasts are made by Coast Guard radio stations. In general, these broadcasts provide information vital to vessels operating in the approaches and coastal waters of the United States including the Great Lakes, Puerto Rico, and U.S. Virgin Islands.

Scheduled radiotelephone broadcasts include routine weather, small-craft advisories, storm warnings, navigation information, and other advisories and are made on a prepublished schedule of intervals of 3 hours. After the preliminary announcement on VHF-FM channel 16 (156.80 MHz) the station advises shifting to working frequency VHF-FM channel 22A (157.10 MHz). (See the appendix for a list of the stations and their broadcast frequencies and times for the area covered by this Coast Pilot.)

Urgent and safety radiotelephone broadcasts include important Notice to Mariners items, storm warnings, and other vital marine information. U.S. Coast Guard stations which make scheduled broadcasts issue **safety broadcasts** upon receipt and on the next scheduled broadcast. Stations which do not make scheduled broadcasts issue safety broadcasts upon receipt and at intervals of 3 hours for 24 hours. Safety broadcasts are preceded by the safety signal SECURITY (SAY-CURITAY, spoken three times). After the preliminary signal on VHF-FM channel 16 (156.80 MHz), the station may announce shifting to working frequency VHF-FM channel 22A (157.10 MHz). U.S. Coast Guard stations which make scheduled broadcasts issue **urgent broadcasts** upon receipt and on schedule until canceled. Stations which do not make scheduled broadcasts issue urgent broadcasts upon receipt and at intervals of 3 hours until canceled. Urgent broadcasts are preceded by the urgent signal PAN (PAHN, spoken three times). Both the urgent signal and message may be transmitted on VHF-FM channel 16 (156.80 MHz).

Urgent marine information broadcasts are also made on VHF-FM channel 16 (156.80 MHz) by certain commercial radiotelephone stations on the Great Lakes. (See appendix for station location and area of coverage.)

National Weather Service forecasts and warnings are issued at least every 6 hours, more frequently if necessary, by National Weather Service Forecast Offices. (See appendix for addresses.)

Lake Weather Broadcasts (LAWEB) are plain language broadcasts giving current weather for all the Great Lakes and the St. Lawrence River above St. Regis. The broadcasts are prepared and issued by NWS Forecast Office, Cleveland, Ohio. LAWEBs are broadcast by Lorain Electronics, Inc.'s radio station at Lorain, Ohio, and 14 transmitter sites around the lakes and by U.S. Steel's radio station at Rogers City, Mich., and 3 transmitter sites around the lakes. (See appendix for stations and broadcast schedules.)

LAWEBs are also broadcast by the Canadian Coast Guard. (See Canadian Sailing Directions.)

Marine Forecasts (MAFOR) are coded weather forecasts which are preceded by a plain language description of the current weather map. These are issued by NWS Forecast Offices as follows: WSFO Buffalo for Lake Ontario and the St. Lawrence River above St. Regis; WSFO Cleveland for Lake Erie; WSFO Anne Arbor for Lake Huron; and WSFO Chicago for Lake Michigan and Lake Superior. MAFORs are broadcast by Lorain Electronics, Inc.'s radio station at Lorain, Ohio, and 12 other stations around the lakes and by Central Radio Telegraph Company's radio station at Rogers City, Mich., and 3 remote transmitter sites around the lakes. (See appendix for stations and broadcast schedules.)

NOAA Weather Radio provides continuous broadcasts of the latest weather information directly from NWS offices. The broadcasts are tailored to the weather information needs of people within the receiving area. In addition to general weather information, specialized weather information for marine interests is provided by stations along the sea coasts and the Great Lakes. During severe weather, NWS forecasters can interrupt the regular broadcasts and substitute special warning messages. The forecasters can also activate specially designed warning receivers. These receivers either sound an alarm alerting the listener to the forthcoming broadcast or, when operated in a muted mode, automatically turn on so that the warning message is heard.

NOAA Weather Radio taped messages are repeated every 4 to 6 minutes and are routinely revised every 1 to 3 hours, or more frequently if necessary. Most of the stations operate 24 hours daily. The broadcasts are made on three VHF-FM frequencies, 162.40, 162.475, or 162.55 MHz. The 162.475 MHz frequency is only used in special cases where needed to avoid channel interference. A number of manufacturers offer special weather radios to operate on these frequencies, with or without emergency warning alarm, and many AM/FM radios on the market now offer the "weather band" as an added feature. The broadcasts can usually be heard as far as 40 miles from the antenna site, sometimes more. The effective range depends on many factors, including the height of the broadcast antenna, terrain, quality of the receiver, and the type of receiving antenna. As a general rule, listeners close to or perhaps beyond the 40 mile range should have a good quality receiver system to get reliable reception. (See the appendix for a list of these stations in the area covered by this Coast Pilot.)

Marine Weather Services Charts (MSC), published by the National Weather Service, list stations, frequencies, and schedules of broadcasts of Great Lakes weather forecasts and warnings. Chart MSC-11 covers Lakes Superior and Michigan, and chart MSC-12 covers Lakes Huron, Erie, and Ontario. The charts are available from National Ocean Service, Distribution Branch (N/CG33). (See appendix for address.)

Commercial radiotelephone coast stations.–Broadcasts of coastal weather and warnings are made by some commercial radiotelephone coast stations (marine operators) on the normal transmitting frequencies of the stations. Vessels with suitable receivers and desiring this service may determine the frequencies and schedules of these broadcasts from their local stations, from the publication Selected Worldwide Marine Weather Broadcasts, or from the series of Marine Weather Services Charts published by NWS.

Local broadcast-band radio stations.–Many local radio stations in the standard AM and FM broadcast band give local marine weather forecasts from NWS on a regular schedule. These stations are listed on the series of Marine Weather Services Charts published by NWS.

Reports from ships.–The master of every U.S. ship equipped with radio transmitting apparatus, on meeting with a tropical cyclone, dangerous ice, subfreezing air temperatures with gale force winds causing severe ice accretion on superstructures, derelict, or any other direct danger to navigation, is required to cause to be transmitted a report of these dangers to ships in the vicinity and to the appropriate Government agencies.

Many Great Lakes vessels are equipped to take and report weather observations. These are used by NWS to prepare forecasts and are incorporated into LAWEBs. In addition to vessels, these reports are also received from automated weather stations, Coast Guard stations, and other shore facilities.

During the West Indies hurricane season, June 1 to November 30, ships in the Gulf of Mexico, Caribbean Sea area, southern North Atlantic Ocean, and the Pacific waters west of Central America and Mexico are urged to cooperate with NWS in furnishing these special reports in order that warning to shipping and coastal areas may be issued.

Time Signals.–The **National Bureau of Standards** broadcasts time signals continuously, day and night, from its radio stations **WWV**, near Fort Collins, Colorado, (40°49'49"N., 105°02'27"W.) on frequencies of 2.5, 5, 10, 15, and 20 MHz, and **WWVH**, Kekaha, Kauai, Hawaii (21°59'26"N., 159°46'00"W.) on frequencies 2.5, 5, 10, and 15 MHz. Services include time announcements, standard time intervals, standard audio frequencies, Omega Navigation System status reports, geophysical alerts, BCD (binary coded decimal) time code, UT1 time corrections, and high seas storm information.

Time announcements are made every minute, commencing at 15 seconds before the minute by a female voice and at 7½ seconds before the minute by a male voice, from WWVH and WWV, respectively. The time given is in Coordinated Universal Time (UTC) and referred to the time at Greenwich, England, i.e., Greenwich Mean Time.

NBS Special Publication 432 gives a detailed description of the time and frequency dissemination services of the National Bureau of Standards. Single copies may be obtained upon request from the National Bureau of Standards, Boulder, Colo. 80303. Quantities may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Canadian time signals are broadcast by radio station CHU, Ottawa, Ont. (45°17'47"N., 75°45'22"W.), continuously on radio frequencies of 3330, 7335, and 14670 kHz. A tone pulse denotes each second. Omission of the 29th pulse identifies the half minute, and the 51st to 59th pulses are omitted to allow for a voice announcement of the minute. The zero pulse of each minute is 0.5 second long, except that the hour is identified by a 1-second pulse followed by 12 seconds of silence.

NAUTICAL CHARTS

Reporting chart deficiencies.–Users are requested to report all significant observed discrepancies in and desirable additions to NOS nautical charts, including depth information in privately maintained channels and basins; obstructions, wrecks, and other dangers; new landmarks or the nonexistence or relocation of charted ones; uncharted fixed private aids to navigation; and deletions or additions of small-craft facilities. All such reports should be sent to Director, Charting and Geodetic Services, Attention: N/CG22, National Ocean Service, Rockville, Md. 20852.

Chart symbols and abbreviations.–The standard symbols and abbreviations approved for use on all regular nautical charts published by the Defense Mapping Agency Hydrographic/Topographic Center and NOS are contained in **Chart No. 1, United States of America Nautical Chart Symbols and Abbreviations.** This publication is available from the

Defense Mapping Agency Office of Distribution Services and NOS, and their sales agents.

On certain foreign charts reproduced by the United States, and on foreign charts generally, the symbols and abbreviations used may differ from U.S. approved standards. It is, therefore, recommended that navigators who acquire and use foreign charts and reproductions procure the symbol sheet or Chart No. 1 produced by the same foreign agency. The publication **Symbols and Abbreviations Used on Canadian Nautical Charts** is available from the Canadian Hydrographic Chart Distribution Office. (See appendix for address.)

The mariner is warned that the buoyage systems, shapes, and colors used by other countries often have a different significance than the U.S. system.

Chart datum.–The water levels of the individual Great Lakes and their connecting waters are constantly changing. In any one year, the difference between the highest and lowest levels may amount to as much as 3 feet or more. To facilitate charting of depths and vertical heights, it has become necessary to adopt a standard or fixed reference level for each lake in the Great Lakes system. In 1955, representatives of the U.S. Lake Survey (now part of the National Ocean Service) and the Canadian Hydrographic Service agreed to one vertical reference for all water levels and bench marks in the Great Lakes-St. Lawrence River system known as **International Great Lakes Datum (1955)** or IGLD (1955). **Pointe-au-Pere (Father Point)**, Quebec, 48°31'09"N., 68°28'25"W., was chosen as the reference zero because: it is the location of the Great Lakes-St. Lawrence River system sea outlet; the mean water level approximates mean sea level in the immediate area; and the tide gage has a long period of reliable records. In turn, a fixed reference level based on IGLD (1955) was chosen for each individual lake. These reference levels are called **Low Water Datum** (LWD) and are the chart datum for the particular lake or river. The values of Low Water Datum were chosen so that during the navigation season the actual water levels in each lake would be above the datum most of the time. Depths, clearances under bridges and overhead cables, and heights of terrestial objects in the Great Lakes are all measured from chart datum, Low Water Datum for the particular body of water. Note that this is different from coastal waters, where depths and heights are measured from separate datums based upon tidal fluctuations.

The official definitions of the vertical datums on the Great Lakes are: International Great Lakes Datum (1955) or IGLD (1955)-Mean water level at Pointe-au-Pere, Quebec, on the Gulf of St. Lawrence over the period 1941-1956, from which dynamic elevations throughout the Great Lakes region are measured. The term is often used to mean the entire system of dynamic elevations rather than just the referenced water level.

Low Water Datum (LWD)-The dynamic elevation for each of the Great Lakes and Lake St. Clair and the corresponding sloping surfaces of the St. Marys, St. Clair, Detroit, Niagara, and St. Lawrence Rivers to which are referred the depths shown on the navigation charts and the authorized depth for navigation improvement projects. Elevations of these planes are referred to IGLD (1955) and are Lake Superior 600.0 feet, Lakes Michigan and Huron 576.8 feet, Lake St. Clair 571.7 feet, Lake Erie 568.6 feet, and Lake Ontario 242.8 feet.

Accuracy of a nautical chart.–The value of a nautical chart depends upon the accuracy of the surveys on which it is based. The chart reflects what was found by field surveys and what has been reported to NOS headquarters. The chart represents general conditions at the time of surveys or reports and does not necessarily portray present conditions. Significant changes may have taken place since the date of the last survey or report.

Each sounding represents an actual measure of depth and location at the time the survey was made, and each bottom characteristic represents a sampling of the surface layer of the lake bottom at the time of sampling. Areas where sand and mud prevail, especially the entrances and approaches to bays and rivers exposed to strong currents and heavy seas, are subject to continual change.

In regions where rocks and boulders abound, it is always possible that surveys may have failed to find every obstruction. Thus, when navigating such waters, customary routes and channels should be followed and areas avoided where irregular and sudden changes in depth indicate conditions associated with pinnacle rocks or boulders.

Information charted as "reported" should be treated with caution in navigating the area, because the actual conditions have not been verified by Government surveys.

The **date of a chart** is of vital importance to the navigator. When charted information becomes obsolete, further use of the chart for navigation may be dangerous. Announcements of new editions of nautical charts are usually published in notices to mariners. A quarterly list of the latest editions is distributed to sales agents; free copies may be obtained from the sales agents or by writing to Distribution Branch (N/CG33), National Ocean Service. (See appendix for address.)

U.S. Nautical Chart Numbering System.–This chart numbering system, adopted by the National Ocean Service and the Defense Mapping Agency Hydrographic/Topographic Center, provides for a uniform method of identifying charts published by both agencies. For charts published by NOS, a cross reference list of new and old chart numbers (Nautical Chart Number Conversion Table) can be obtained, without charge, from any of its sales agents or from Distribution Branch (N/CG33), National Ocean Service. (See appendix for address.) The Coast Pilot reflects only the new chart numbers. Use the new numbers when ordering charts. Nautical charts published by the Canadian Hydrographic Service are identified in this Coast Pilot by an asterisk preceding the chart number.

Corrections to charts.–It is essential for navigators to keep charts corrected through information published in the notices to mariners, especially since the NOS no longer hand-corrects charts prior to distribution.

Caution in using small-scale charts.–Dangers to navigation cannot be shown with the same amount of detail on small-scale charts as on those of larger scale. Therefore, the largest scale chart of an area should always be used.

The **scales of nautical charts** range from 1:2,500 to about 1:5,000,000. Graphic scales are generally shown on charts with scales of 1:80,000 or larger, and numerical scales are given on smaller scale charts. NOS charts are classified according to scale as follows:

Sailing charts, scales 1:600,000 and smaller, are for use in fixing the mariner's position as he approaches the coast from the open ocean, or for sailing between distant coastwise ports. On such charts the shoreline and topography are generalized and only offshore soundings, and the principal lights, outer buoys, and landmarks visible at considerable distances are shown.

General charts, scales 1:150,000 to 1:600,000, are for coastwise navigation outside of outlying reefs and shoals.

Coast charts, scales 1:50,000 to 1:150,000, are for inshore navigation leading to bays and harbors of considerable width and for navigating large inland waterways.

Harbor charts, scales larger than 1:50,000, are for harbors, anchorage areas, and the smaller waterways.

Several categories of special charts are published for the waters of the Great Lakes. **Small-craft charts** contain information of interest to small-craft operators and fold into convenient panels. **Recreational-craft charts** are a series of large-scale charts of certain harbors and confined localities published in book form. **Canoe charts** provide coverage of the Minnesota-Ontario Border Lakes for small shallow-draft vessels. Most of the canoe charts do not show hydrography.

Blue tint in water areas.–A blue tint is shown in water areas on many charts to accentuate shoals and other areas considered dangerous for navigation when using that particular chart. Since the danger curve varies with the intended purpose of a chart, a careful inspection should be made to determine the contour depth of the blue tint areas.

Caution on bridge and cable clearances.–For bascule bridges whose spans do not open to a full vertical position, unlimited overhead clearance is not available for the entire charted horizontal clearance when the bridge is open, due to the inclination of the drawspans over the channel.

The charted clearances of overhead cables are for the lowest wires at Low Water Datum unless otherwise stated. **Vessels with masts, stacks, booms, or antennas should allow sufficient clearance under power cables to avoid arcing.**

Submarine cables and pipelines cross many waterways used by both large and small vessels. Numerous water intakes extend from the lakeshores. The intake cribs at the outer ends of these pipelines may extend several feet above the lake bottom. In some Canadian waters there are extensive networks of submerged pipelines carrying natural gas. The wellheads extend several feet above the lake bottom. Submerged structures in inshore waters are generally buried below the lakebed or riverbed, while offshore structures may lie on the lakebed. Warning signs are often posted to warn mariners of the existence of submarine cables and pipelines.

The installation of submarine cables or pipelines in U.S. waters or the continental shelf of the United States is under the jurisdiction of one or more Federal agencies, depending on the nature of the installation. They are shown on the charts when the necessary information is reported to NOS and they have been recommended for charting by the cognizant agency. The chart symbols for submarine cable and pipeline areas are usually shown for inshore areas, whereas, chart sumbols for submarine cable and pipeline routes may be shown for offshore areas. Submarine cables and pipelines are not usually described in the Coast Pilots.

In view of the serious consequences resulting from damage to submarine cables and pipelines, vessel operators should take special care when anchoring, fishing, or engaging in underwater operations near areas where these cables or pipelines may exist or have been reported to exist.

Certain cables carry high voltage, while many pipelines carry natural gas under high pressure or petroleum products. Electrocution, fire, or explosion with injury, loss of life, or a serious pollution incident could occur if they are broached.

Vessels fouling a submarine cable or pipeline should attempt to clear without undue strain. Anchors or gear that cannot be cleared should be slipped, but no attempt should be made to cut a cable or pipeline.

Artificial obstructions to navigation.–**Disposal areas** are designated by the Corps of Engineers for depositing dredged material where existing depths indicate that the intent is not to cause sufficient shoaling to create a danger to surface navigation. The areas are charted without blue tint, and soundings and depth curves are retained.

Dump Sites are areas established by Federal regulation (40 CFR 220-229) in which dumping of dredged and fill material and other nonbuoyant objects is allowed with the issuance of a permit. Dumping of dredged and fill material is supervised by the Corps of Engineers and all other dumping by the Environmental Protection Agency (EPA). (See Corps of Engineers and Environmental Protection Agency, this chapter, and appendix for office addresses.)

Dumping Grounds are also areas that were established by Federal regulation (33 CFR 205). However, these regulations have been revoked and the use of the areas discontinued. These areas will continue to be shown on nautical charts until such time as they are no longer considered to be a danger to navigation.

Dump Sites and Dumping Grounds are rarely mentioned in the Coast Pilot, but are shown on nautical charts. **Mariners are advised to exercise extreme caution in and in the vicinity of all dumping areas.**

Spoil areas are for the purpose of depositing dredged material, usually near and parallel to dredged channels; they are usually a hazard to navigation. Spoil areas are usually charted from survey drawings from Corps of Engineers after-dredging surveys, though they may originate from private or other Government agency surveys. Spoil areas are tinted blue on the charts and labeled, and all soundings and depth curves are omitted. Navigators of even the smallest craft should avoid crossing spoil areas.

Fish havens are established by private interests, usually sport fishermen, to simulate natural reefs and wrecks that attract fish. The reefs are constructed by dumping assorted junk, ranging from old trolley cars and barges to scrap building material, in areas which may be of very small extent or may stretch a considerable distance along a depth curve; old automobile bodies are a commonly used material. The Corps of Engineers must issue a permit, specifying the location and depth over the reef, before such a reef may be built. However, the reefbuilders' adherence to permit specifications can be checked only with a wire drag. Fish havens are outlined and labeled on the charts and show the minimum authorized depth when known. Fish havens are tinted blue if they have a minimum authorized depth of 11 fathoms or less or if the minimum authorized depth is unknown and they are in depths greater than 11 fathoms but still considered a danger to navigaton. Navigators should be cautious about passing over fish havens or anchoring in their vicinity.

Fishtrap areas are areas established by the Corps of Engineers, or State or local authority, in which traps may be built and maintained according to established regulations. The fish stakes which may exist in these areas are obstructions to navigation and may be dangerous. The limits of fishtrap areas and a cautionary note are usually charted. Navigators should avoid these areas.

Local magnetic disturbances.–If measured values of magnetic variation differ from the expected (charted) values by several degrees, a magnetic disturbance note will be printed on the chart. The note will indicate the location and magnitude of the disturbance, but the indicated magnitude should not be considered as the largest possible value that may be encountered. Large disturbances are more frequently detected in the shallow waters near land masses than in deep water. Generally, the effect of a local magnetic disturbance diminishes rapidly with distance, but in some locations there are multiple sources of disturbances and the effects may be distributed for many miles.

Compass roses on charts.–Each compass rose shows the date, magnetic variation, and the annual change in variation. Prior to the new edition of a nautical chart, the compass roses are reviewed. Corrections for annual change and other revisions may be made as a result of newer and more accurate information. On some general and sailing charts, the magnetic variation is shown by isogonic lines in addition to the compass roses.

The **Polyconic projection** is used on most U.S. nautical charts of the Great Lakes. On this projection, parallels of latitude appear as nonconcentric circles, and meridians appear as curved lines converging toward the pole and concave to the central meridian. The scale is correct along any parallel and along the central meridian of the projection. Along other meridians the scale increases with increased difference of longitude from the central meridian.

The **Mercator projection** used on some nautical charts of the Great Lakes has straight-line meridians and parallels that intersect at right angles. On any particular chart the distances between meridians are equal throughout, but distances between parallels increase progressively from the Equator toward the poles, so that a straight line between any two points is a rhumb line. This unique property of the Mercator projection is one of the main reasons why it is preferred by the mariner.

Echo soundings.–Ships' echo sounders may indicate small variations from charted soundings; this may be due to the fact that various corrections (instrument corrections, settlement and squat, draft, and velocity corrections) are made to echo soundings in surveying which are not normally made in ordinary navigation, or to observational errors in reading the echo sounder. Instrument errors vary between different equipment and must be determined by calibration aboard ship. Most types of echo sounders are factory calibrated for a velocity of sound in water of 800 fathoms per second, but the actual velocity may differ from the calibrated velocity by as much as 5 percent, depending upon the temperature and salinity of the waters in which the vessel is operating; the highest velocities are found in warm, highly saline water, and the lowest in icy freshwater. Velocity corrections for these variations are determined and applied to echo soundings during hydrographic surveys. All echo soundings must be corrected for the vessel's draft, unless the draft correction has been set on the echo sounder.

Observational errors include misinterpreting false echos from schools of fish, seaweed, etc., but the most serious error which commonly occurs is where the depth is greater than the scale range of the instrument; a 400-fathom scale indicates 15 fathoms when the depth is 415 fathoms. Caution in navigation should be exercised when wide variations from charted depths are observed.

AIDS TO NAVIGATION

Aids to navigation in United States waters of the Great Lakes and their connecting waters, except for the St. Lawrence River, are maintained by the U.S. Coast Guard. Local jurisdiction for the region is assigned to the Commander, Ninth Coast Guard District. The Lake Champlain region and the Hudson River are under the jurisdiction of the Commander, Third Coast Guard District. (See appendix for addresses.)

Reporting of defects in aids to navigation.–Promptly notify the nearest Coast Guard District Commander if an aid to navigation is observed to be missing, sunk, capsized, out of position, damaged, extinguished, or showing improper characteristics.

Radio messages should be prefixed "Coast Guard" and transmitted directly to any U.S. Government shore radio station for relay to the Coast Guard District Commander. Merchant ships may send messages relating to defects noted in aids to navigation through commercial facilities only when they are unable to contact a U.S. Government shore radio station. Charges for these messages will be accepted "collect" by the Coast Guard.

It is unlawful to establish or maintain any aid similar to those maintained by the U.S. Coast Guard without first obtaining permission from the Coast Guard District Commander. In the Great Lakes, applications should be submitted through the Cleveland District Office. The licensed officer in command of a vessel which collides with any aid must report the fact promptly to the nearest Marine Safety Office or Marine Inspection Office, U.S. Coast Guard.

Lights.–The range of visibility of lights as given in the Light Lists and as shown on the charts is the **Nominal range,** which is the maximum distance at which a light may be seen in clear weather (meteorological visibility of 11.5 statute miles) expressed in statute miles. The Light Lists give the Nominal ranges for all Coast Guard lighted aids except range and directional lights. **Luminous range** is the maximum distance at which a light may be seen under the existing visibility conditions. By use of the diagram in the Light Lists, Luminous range may be determined from the known Nominal range, and the existing visibility conditions. Both the Nominal and Luminous ranges do not take into account elevation, observer's height of eye, or the curvature of the earth. **Geographic range** is a function of only the curvature of the earth and is determined solely from the heights above sea level of the light and the observer's eye; therefore, to determine the actual geographic range for a height of eye, the Geographic range must be corrected by a distance corresponding to the height difference, the distance correction being determined from a table of "distances of visibility for various heights above sea level." (See Light List or Coast Pilot table following appendix.) The maximum distances at which lights can be seen may at times be increased by abnormal atmospheric refraction and may be greatly decreased by unfavorable weather conditions, such as fog, rain, haze, or smoke. All except the most powerful lights are easily obscured by such conditions. In some conditions of the atmosphere white lights may have a reddish hue. During weather conditions which tend to reduce visibility, colored lights are more quickly lost to sight than are white lights. Navigational lights should be used with caution because of the following conditions that may exist:

A light may be extinguished and the fact not reported to the Coast Guard for correction, or a light may be located in an isolated area where it will take time to correct.

In regions where ice conditions prevail, the lantern panes of unattended lights may become covered with ice or snow, which will greatly reduce the visibility and may also cause colored lights to appear white.

Brilliant shore lights used for advertising and other purposes, particularly those in densely populated areas, make it difficult to identify a navigational light.

At short distances flashing lights may show a faint continuous light between flashes.

The distance of an observer from a light cannot be estimated by its apparent intensity. The characteristics of lights in an area should always be checked in order that powerful lights visible in the distance will not be mistaken for nearby lights showing similar characteristics at low intensity such as those on lighted buoys.

The apparent characteristic of a complex light may change with the distance of the observer, due to color and intensity variations among the different lights of the group. The characteristic as charted and shown in the Light List may not be recognized until nearer the light.

Motion of a vessel in a heavy sea may cause a light to alternately appear and disappear, and thus give a false characteristic.

Where lights have different colored sectors, be guided by the correct bearing of the light; do not rely on being able to accurately observe the point at which the color changes. On either side of the line of demarcation of colored sectors there is always a small arc of uncertain color.

On some bearings from the light, the range of visibility of the light may be reduced by obstructions. In such cases, the obstructed arc might differ with height of eye and distance. When a light is cut off by adjoining land and the arc of visibility is given, the bearing on which the light disappears may vary with the distance of the vessel from which observed and with the height of eye. When the light is cut off by a sloping hill or point of land, the light may be seen over a wider arc by a ship far off than by one close to.

Arcs of circles drawn on charts around a light are not intended to give information as to the distance at which it can be seen, but solely to indicate, in the case of lights which do not show equally in all directions, the bearings between which the variation of visibility of obscuration of the light occurs.

Lights of equal candlepower but of different colors may be seen at different distances. This fact should be considered not only in predicting the distance at which a light can be seen, but also in identifying it.

Lights should not be passed close aboard, because in many cases riprap mounds are maintained to protect the structure against ice damage and scouring action.

Many prominent towers, tanks, smokestacks, buildings, and other similar structures, charted as landmarks, display flashing and/or fixed red aircraft obstruction lights. Lights shown from landmarks are charted only when they have distinctive characteristics to enable the mariner to positively identify the location of the charted structure.

Articulated lights.–An articulated light is a vertical pipe structure supported by a submerged buoyancy chamber and attached by a universal coupling to a weighted sinker on the seafloor. The light, allowed to move about by the universal coupling, is not as precise as a fixed aid. However, it has a much smaller watch circle than a conventional buoy, because the buoyancy chamber tends to force the pipe back to a vertical position when it heels over under the effects of wind, wave, or current.

Bridge lights and clearance gages.–The Coast Guard regulates marine obstruction lights and clearance gages on bridges across navigable waters. Where installed, clearance gages are generally vertical numerical scales, reading from top to bottom, and show the actual vertical clearance between the existing water level and the lowest point of the bridge over the channel; the gages are normally on the right-hand pier or abutment of the bridge, on both the upstream and downstream sides.

Bridge lights are fixed red or green, and are privately maintained; they are generally not charted or described in the text of the Coast Pilots. All bridge piers (and their protective fenders) and abutments which are in or adjacent to a navigation channel are marked on all channel sides by red lights. On each channel span of a fixed bridge, there is a range of two green lights marking the center of the channel and a red light marking both edges of the channel, except that when the margins of the channel are confined by bridge piers, the red lights on the span are omitted, since the pier lights then mark the channel edges; for multiplespan fixed bridges, the main channel span may also be marked by three white lights in a vertical line above the green range lights.

On all types of drawbridges, one or more red lights are shown from the drawspan (higher than the pier lights) when the span is closed; when the span is open, the higher red lights are obscured and one or two green lights are shown from the drawspan, higher than the pier lights. The number and location of the red and green lights depend upon the type of drawbridge.

Bridges and their lighting, construction, maintenance, and operations are set forth in 33 CFR 114-118. Aircraft obstruction lights, prescribed by the Federal Aviation Administration, may operate at certain bridges. Drawbridge operation regulations are published in chapter 2 of the Coast Pilots.

Fog signals.–Caution should be exercised in the use of sound fog signals for navigation purposes. They should be considered solely as warning devices.

Sound travels through the air in a variable manner, even without the effects of wind; therefore, the hearing of fog signals cannot be implicitly relied upon.

Experience indicates that distances must not be judged only by the intensity of the sound; that occasionally there may be areas close to a fog signal in which it is not heard; and that fog may exist not far from a station, yet not be seen from it, so the signal may not be operating. It is not always possible to start a fog signal immediately when fog is observed.

Avoidance of collision with lightships, ocean station vessels, offshore light stations, and large navigational buoys (LNB).–Courses should invariably be set to pass these aids with sufficient clearance to avoid the possibility of collision from any cause. Errors of observation, current and wind effects, other vessels in the vicinity, and defects in steering gear may be, and have been, the cause of actual collisions, or imminent danger thereof, needlessly jeopardizing the safety of these facilities and their crews, and of all navigation dependent on these important aids to navigation.

Experience shows that lightships and offshore light stations cannot be safely used as leading marks to be passed close aboard, but should always be left broad off the course, whenever sea room permits. When approaching lightships, ocean station vessels, fixed offshore light structures, and large navigational buoys (LNB) on radio bearings, the risk of collision will be avoided by ensuring that radio bearing does not remain constant.

It should be borne in mind that most lightships and large buoys are anchored to a very long scope of chain and, as a result, the radius of their swinging circle is considerable. The charted position is the location of the anchor. Furthermore, under certain conditions of wind and current, they are subject to sudden and unexpected sheers which are certain to hazard a vessel attempting to pass close aboard.

During extremely heavy weather and due to their exposed locations, lightships may be carried off station without the knowledge and despite the best efforts of their crews. The mariner should, therefore, not implicitly rely on a lightship maintaining its precisely charted position during and immediately following severe storms. A lightship known to be off station will secure her light, fog signal, and radiobeacon and fly the International Code signal "LO" signifying "I am not in my correct position."

Watch (station) buoys are sometimes moored near lightships and important buoys to mark the approximate station should these important aids be carried away or temporarily removed. The lightship watch buoy also gives the crew an indication of dragging.

Since these uncharted buoys are always unlighted and, in some cases, moored as much as 1 mile from the lightship or buoy, the danger of a closely passing vessel colliding with them is always present, particularly during darkness or periods of reduced visibility.

Buoys.–The aids to navigation depicted on charts comprise a system consisting of fixed and floating aids with varying degrees of reliability. Therefore, prudent mariners will not rely solely on any single aid to navigation, particularly a floating aid.

The approximate position of a buoy is represented by the dot or circle associated with the buoy symbol. The approximate position is used because of practical limitations in positioning and maintaining buoys and their sinkers in precise geographical locations. These limitations include, but are not limited to, inherent imprecisions in position fixing methods, prevailing atmospheric and lake conditions, the slope of and the material making up the lakebed, the fact that buoys are moored to sinkers by varying lengths of chain, and the fact that buoy body and/or sinker positions are not under continuous surveillance, but are normally checked only during periodic maintenance visits which often occur more than a year apart. The position of the buoy body can be expected to shift inside and outside of the charting symbol due to the forces of nature. The mariner is also cautioned that buoys are liable to be carried away, shifted, capsized, sunk, etc. Lighted buoys may be extinguished or sound signals may not function as a result of ice, running ice or other natural causes, collisions, or other accidents.

For the foregoing reasons, a prudent mariner must not rely completely upon the charted position or operation of floating aids to navigation, but will also utilize bearings from fixed objects and aids to navigation on shore. Further, a vessel attempting to pass close aboard always risks collision with a yawing buoy or with the obstruction the buoy marks.

Buoys may not always properly mark shoals or other obstructions due to shifting of the shoals or of the buoys. Buoys marking wrecks or other obstructions are usually placed on the lakeward or channelward side and not directly over a wreck. Since buoys may be located some distance from a wreck they are intended to mark, and since sunken wrecks are not always static, extreme caution should be exercised when operating in the vicinity of such buoys.

Caution, channel markers.–Lights, daybeacons, and buoys along dredged channels do not always mark the bottom edges. Due to local conditions, aids may be located inside or outside the channel limits shown by dashed lines on a chart. The Light List tabulates the offset distances for these aids in many instances.

Aids may be moved, discontinued, or replaced by other types to facilitate dredging operations. Mariners should exercise caution when navigating areas where dredges with auxiliary equipment are working.

Temporary changes in aids are not included on the charts.

Radiobeacons.–A map showing the locations and operating details of marine radiobeacons is given in each Light List. This publication describes the procedure to follow in using radiobeacons to calibrate radio direction finders as well as listing special radio direction finder calibration stations.

A vessel steering a course for a radiobeacon should observe the same precautions as when steering for a light or any other mark. If the radiobeacon is aboard a lightship, particular care should be exercised to avoid the possibility of collision, and sole reliance should never be placed on sighting the lightship or hearing its fog signal. If there are no dependable means by which the vessel's position may be fixed and the course changed well before reaching the lightship, a course should be selected that will ensure passing the lightship at a distance, rather than close aboard, and repeated bearings of the radiobeacon should show an increasing change in the same direction.

Radio bearings.–No exact data can be given as to the accuracy to be expected in radio bearings taken by a ship, since the accuracy depends to a large extent upon the skill of the ship's operator, the condition of the ship's equipment, and the accuracy of the ship's calibration curve. Mariners are urged to obtain this information for themselves by taking frequent radio bearings when their ship's position is accurately known and recording the results.

Radio bearings obtained at twilight or at night, and bearings which are almost parallel to the shore, should be accepted with reservations, due to "night effect" and to the distortion of radio waves which travel over land. Bearings of aircraft ranges and standard broadcast stations should be used with particular caution due to coastal refraction and lack of calibration of their frequencies.

Conversion of radio bearings to Mercator bearings.–Radio directional bearings are the bearings of the great circles passing through the radio stations and the ship, and, unless in the plane of the Equator or a meridian, would be represented on a Mercator chart as curved lines. Obviously it is impracticable for a navigator to plot such lines on a Mercator chart, so it is necessary to apply a correction to a radio bearing to convert it into a Mercator bearing, that is the bearing of a straight line on a Mercator chart laid off from the sending station and passing through the receiving station.

A table of corrections for the conversion of a radio bearing into a Mercator bearing follows the appendix. It is sufficiently accurate for practical purposes for distances up to 1,000 miles.

The only data required are the latitudes and longitudes of the radiobeacons and of the ship by dead reckoning. The latter is scaled from the chart, and the former is either scaled from the chart or taken from the Light List.

The table is entered with the differences of longitude in degrees between the ship and station (the nearest tabulated value being used), and opposite the middle latitude between the ship and station, the correction to be applied is read.

The sign of the correction (bearings read clockwise from the north) will be as follows: In N latitude, the minus sign is used when the ship is E of the radiobeacon and the plus sign used when the ship is W of the radiobeacon. In S latitude, the plus sign is used when the ship is E of the radiobeacon, and the minus sign is used when the ship is W of the radiobeacon.

To facilitate plotting, 180 degrees should be added to or subtracted from the corrected bearing, and the result plotted from the radiobeacon.

Should the position by dead reckoning differ greatly from the true position of the ship as determined by plotting the corrected bearings, retrial should be made, using the new value as the position of the ship.

Radio bearings from other vessels.–Any vessel with a radio direction finder can take a bearing on a vessel equipped with a radio transmitter. These bearings, however, should be used only as a check, as comparatively large errors may be introduced by local conditions surrounding the radio direction finder unless known and accounted for. Although any radio station, for which an accurate position is definitely known, may serve as a radiobeacon for vessels equipped with a radio direction finder, extreme caution must be exercised in their use. Stations established especially for maritime services are more reliable.

Radar beacons (Racons) are low-powered radio transceivers that operate in the marine radar X-band frequencies. When activated by a vessel's radar signal, Racons provide a distinctive visible display on the vessel's radarscope from which the range and bearing to the beacon may be determined. (See Light List, DMAHTC Pub. 117A, or Canadian Notice to Mariners Annual Edition for details.)

Loran.–A list of stations and descriptive details of the Loran System are given in the Light Lists. Instructions, tables, and charts of the Loran System are published by the Defense Mapping Agency Hydrographic/Topographic Center. NOS shows loran lines on the small scale chart of each of the Great Lakes.

Exact data cannot be given as to the accuracy to be expected in loran positions since the accuracy depends to a large extent on the skill of the operator, the condition and type of receiving equipment, and the area of operation. The accuracy of a Loran fix is determined by the accuracy of the individual lines of positions used to establish the fix and by their angle of intersection.

Loran position determinations on or near the baseline extensions are subject to geometric errors exceeding 2 nautical miles per microsecond and, therefore, should be avoided whenever possible. Loran is a long-range aid to navigation and should not normally be used in inshore waters. The use of skywaves is not recommended within 250 miles of either station.

Caution must be used in matching loran signals to ensure that the groundwave signal of the master station is not unknowingly matched with a skywave signal of a secondary station, or vice versa; or that a one-hop skywave from one station is not matched with a two-hop skywave signal from the other.

Omega.–Omega is a continuous radionavigation system which provides hyperbolic lines of position through phase comparisons of very low frequency (10-14 kHz range) continuous wave signals transmitted on a common frequency on a time shared basis. With eight transmitting stations located throughout the world, Omega provides worldwide all-weather navigation coverage. Six stations make Omega available in nearly all parts of the globe, with the two other stations providing redundancy and coverage during off-air time for maintenance.

Users are cautioned that the Omega system is in an implementation stage. System changes and station off-air periods are promulgated by Notice to Mariners and radio navigational warning messages. Current information on the status of individual Omega transmitting stations is broadcast on station WWV, 16 minutes after the hour, and on station WWVH, 47 minutes after the hour. Current status reports are available by telephone (202-245-0298).

At the present time the worldwide accuracy and reliability of this system cannot be precisely determined. Therefore positioning information derived from Omega should not be totally relied upon without reference to other positioning methods.

Uniform State Waterway Marking System.–Many bodies of water used by boatmen are located entirely within the boundaries of a State. The Uniform State Waterway Marking System (USWMS) has been developed to indicate to the small-boat operator hazards, obstructions, restricted or controlled areas, and to provide directions. Although intended primarily for waters within the State boundaries, USWMS is suited for use in all water areas, since it supplements and is generally compatible with the Coast Guard lateral system of aids to navigation. The Coast Guard is gradually using more aids bearing the USWMS geometric shapes described below.

Two categories of waterway markers are used. Regulatory markers, buoys, and signs use distinctive standard shape marks to show regulatory information. The signs are white with black letters and have a wide orange border. They signify speed zones, restricted areas, danger areas, and directions to various places. Aids to navigation on State waters use red and black buoys to mark channel limits. Red and black buoys are generally used in pairs. The boat should pass between the red buoy and its companion black buoy. If the buoys are not placed in pairs, the distinctive color of the buoy indicates the direction of dangerous water from the buoy. White buoys with red tops should be passed to the S or W, indicating that danger lies to the N or E of the buoy. White buoys with black tops should be passed to the N or E. Danger lies to the S or W. Vertical red and white striped buoys indicate a boat should not pass between the buoy and the nearest shore. Danger lies inshore of the buoy.

SPECIAL SIGNALS FOR CERTAIN VESSELS

Special signals for surveying vessels.–National Oceanic and Atmospheric Administration (NOAA) vessels engaged in survey operations and limited in their ability to maneuver because of the work being performed (handling equipment over-the-side such as water sampling or conductivity-temperature-density (CTD) casts, towed gear, bottom samples, etc., and divers working on, below or in proximity of the vessel) are required by Navigation Rules, International-Inland, Rule 27, to exhibit:

(b)(i) three all-round lights in a vertical line where they can best be seen. The highest and lowest of these lights shall be red and the middle light shall be white;

(ii) three shapes in a vertical line where they can best be seen. The highest and lowest of these shapes shall be balls and the middle one a diamond;

(iii) when making way through the water, masthead lights, sidelights and a sternlight, in addition to the lights prescribed in subparagraph (b)(i); and

(iv) when at anchor, in addition to the lights or shapes prescribed in subparagraphs (b)(i) and (ii) the light, lights or shapes prescribed in Rule 30, Anchored Vessels and Vessels Aground.

The color of the above shapes is black.

A NOAA vessel engaged in hydrographic survey operations (making way on a specific trackline while sounding the bottom) is not restricted in its ability to maneuver and therefore exhibits at night only those lights required for a power-driven vessel of its length.

The **wire drags** used by NOAA in sweeping for dangers to navigation may be crossed by vessels without danger of fouling at any point except between the towing launches and the large buoys near them, where the towline approaches the surface of the water. Vessels passing over the drag are requested to change course so as to cross it approximately at right angles, as a diagonal course may cause the propeller to foul the supporting buoys and attached wires. No attempt should be made to pass between the drag launches while the wire is being set out or taken in, unless it would endanger a vessel to do otherwise, because the bottom wire is slack and the floats at each 100-foot section may lift it nearly to the surface; at this time the launches usually are headed directly toward or away from each other and the operation may be clearly seen.

Warning signals for Coast Guard vessels while handling or servicing aids to navigation are the same as those prescribed for surveying vessels. (See Special Signals for Surveying Vessels, this chapter.)

NAVIGATION RESTRICTIONS AND REQUIREMENTS

Oil Pollution.–The Oil Pollution Act, 1961, as amended, provides for prohibited zones throughout the world within which the discharge of oil or any oily mixture is unlawful. The prohibited zones for the United States, Puerto Rico, the U.S. Virgin Islands, and adjacent foreign territory include sea areas within 50 miles from the nearest land and the following sea areas extending more than 50 miles from the nearest land: North-West Atlantic Zone, comprising the sea areas within a line drawn from 38°47'N., 73°43'W., to 39°58'N., 68°34'W., thence to 42°05'N., 64°37'W., thence along the E coast of Canada at a distance of 100 miles from the nearest land. Canadian Western Zone (Pacific Ocean), extending for a distance of 100 miles from the nearest land along the W coast of Canada.

The law applies (with the exceptions stated below) to any seagoing vessel of any type whatsoever of American registry or nationality, including floating craft towed by another vessel making a sea voyage; this includes a **"tanker,"** defined as a type of ship in which the greater part of the cargo space is constructed or adapted for the carriage of liquid cargoes in bulk and which is not, for the time being, carrying a cargo other than oil in that part of its cargo space. The excepted categories of vessels are: tankers of under 150 gross tons, and other ships of under 500 gross tons; ships for the time being engaged in the whaling industry when actually employed on whaling operations; ships for the time being navigating the Great Lakes of North America and their connecting and tributary waters as far E as the lower exit of St. Lambert Lock at Montreal in the Province of Quebec, Canada; naval ships and ships for the time being used as naval auxiliaries.

Foreign vessels to which the International Convention for the Prevention of the Pollution of the Sea by Oil (1954, as amended) applies, while in the territorial waters of the United States, may be boarded, examined, and required to produce records as provided in Section 11 of the Oil Pollution Act of 1961, as amended. (For a complete discussion of the Oil Pollution Regulations, see 33 CFR 151.)

The Federal Water Pollution Control Act, as amended, prohibits the discharge of a harmful quantity of oil or a hazardous substance into or upon the United States navigable waters or adjoining shorelines, the waters of the contiguous zone or beyond the contiguous zone to the limits of the fisheries conservation zone established in 1976 or the limits of the Outer Continental Shelf. Discharges that do occur must be reported to the Coast Guard (National Response Center) by the most rapid available means. To assist in swift reporting of spills, a nationwide, 24-hour, toll-free telephone number has been established (1-800-424-8802). If the spiller or any other industry organization, or State or local government, does not clean up the spill, the Federal Government may. The spiller will be liable for the cleanup costs. A harmful discharge of oil has been defined as one which causes a film or sheen upon or discoloration of the surface of the water, violates applicable State water quality standards, or causes a sludge or emulsion to be deposited beneath the surface of the water. (For regulations pertaining to this Act, see 33 CFR 153.)

Other requirements for the protection of navigable waters.–U.S. laws prohibit discharge from any vessel or shore establishment of any refuse matter, other than that flowing from streets and sewers in a liquid state, into any navigable water unless the vessel is equipped with a Coast Guard certified flow-through marine sanitation device. It is not lawful to tie up or anchor vessels or to float lografts in navigable channels in such manner as to obstruct normal navigation. When a vessel or raft is wrecked and sunk in a navigable channel it is the duty of the owner to immediately mark it with a buoy or beacon during the day and a light at night until the sunken craft is removed or abandoned.

Obligation of deck officers.–Licensed deck officers are required to acquaint themselves with the latest information published in Notice to Mariners regarding aids to navigation.

Improper use of searchlights prohibited.–No person shall flash or cause to be flashed the rays of a searchlight or other blinding light onto the bridge or into the pilothouse of any vessel underway. The International Code Signal "PG2" may be made by a vessel inconvenienced by the glare of a searchlight in order to apprise the offending vessel of the fact.

Unnecessary whistling prohibited.–The unnecessary sounding of the vessel's whistle is prohibited within any harbor limits of the United States.

Use of Radar.–Navigation Rules, International-Inland, Rule 7, states, in part, that every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt, such risk shall be deemed to exist. Proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.

This rule places an additional responsibility on vessels which are equipped and manned to use radar to do so while underway during periods of reduced visibility without in any way relieving commanding officers of the responsibility of carrying out normal precautionary measures.

Navigation Rules, International-Inland, Rules 6, 7, 8, and 19 apply to the use of radar.

Danger signal.–Navigation Rules, International-Inland, Rule 34(d), states that when vessels in sight of one another are approaching each other and from any cause either vessel fails to understand the intentions or actions of the other, or is in doubt whether sufficient action is being taken by the other to avoid collision, the vessel in doubt shall immediately indicate such doubt by giving at least five short and rapid blasts on the whistle. Such signal may be supplemented by a light signal of at least five short and rapid flashes.

Narrow channels.–Navigation Rules, International-Inland, Rule 9(b) states: A vessel of less than 65.6 feet (20 meters) in length or a sailing vessel shall not impede the passage of a vessel that can safely navigate only within a narrow channel or fairway.

Control of shipping in time of emergency or war.–In time of war or national emergency, merchant vessels of the United States and those foreign flag vessels, which are considered under effective U.S. control, will be subject to control by agencies of the U.S. Government. The allocation and employment of such vessels, and of domestic port facilities, equipment, and services will be performed by appropriate agencies of the War Transport Administration. The movement, routing, and diversion of merchant ships at sea will be controlled by appropriate naval commanders. The movement of merchant ships within domestic ports and dispersal anchorages will be coordinated by the U.S. Coast Guard. The commencement of naval control will be signalled by a general emergency message. (See DMAHTC Pub. 117A or 117B for emergency procedures and communication instructions.)

U.S. Fishery Conservation Zone.–The United States exercises exclusive fishery management authority over all species of fish, except tuna, within the fishery conservation zone, whose seaward boundary is 200 miles from the baseline from which the U.S. territorial sea is measured; all anadromous species which spawn in the United States throughout their migratory range beyond the fishery conservation zone, except within a foreign country's equivalent fishery zone as recognized by the United States; all U.S. Continental Shelf fishery resources beyond the fishery conservation zone. Such resources include American lobster and species of coral, crab, abalone, conch, clam, and sponge, among others.

No foreign vessel may fish, aid, or assist vessels at sea in the performance of any activity relating to fishing including, but not limited to, preparation, supply, storage, refrigeration, transportation, or processing, within the fishery conservation zone, or fish for anadromous species of the United States or Continental Shelf fishery resources without a permit issued in accordance with U.S. law. These permits may only be issued to vessels from countries recognizing the exclusive fishery management authority of the United States in an international agreement. The owners or operators of foreign vessels desiring to engage in fishing off U.S. coastal waters should ascertain their eligibility from their own flag state authorities. Failure to obtain a permit prior to fishing, or failure to comply with the conditions and restrictions established in the permit may subject both vessel and its owners or operators to administrative, civil, and criminal penalties. (Further details concerning foreign fishing are given in 50 CFR 611.)

Reports of foreign fishing activity within the fishery conservation zone should be made to the U.S. Coast Guard. Immediate reports are particularly desired, but later reports by any means also have value. Reports should include the activity observed, the position, and as much identifying information (name, number, homeport, type, flag, color, size, shape, etc.) about the foreign vessel as possible, and the reporting party's name and address or telephone number.

Bridge-to-Bridge Radiotelephone Communica-

tion.–Voice radio bridge-to-bridge communication between vessels is an effective aid in the prevention of collisions where there is restricted maneuvering room and/or visibility. VHF-FM radio is used for this purpose due to its essentially line-of-sight characteristic and relative freedom from static. As VHF-FM has increasingly come into use for short-range communications in U.S. harbors and other high-traffic waters, so has the number of ships equipped with this gear increased.

The Vessel Bridge-to-Bridge Radiotelephone Regulations, effective January 1, 1973, require vessels subject to the Act while navigating to be equipped with at least one single channel transceiver capable of transmitting and receiving on VHF-FM channel 13 (156.65 MHz), the Bridge-to-Bridge Radiotelephone frequency. Vessels with multichannel equipment are required to have an additional receiver so as to be able to guard VHF-FM channel 13 (156.65 MHz), the Bridge-to-Bridge Radiotelephone frequency, in addition to VHF-FM channel 16 (156.80 MHz), the National Distress, Safety, and Calling frequency required by Federal Communications Commission regulations. (See **33 CFR 26.01 through 26.10**, chapter 2, for Vessel Bridge-to-Bridge Radiotelephone Regulations.)

Vessels operating on the Great Lakes and certain connecting and tributary waters are subject to the provisions of the Great Lakes Radio Agreement between the United States and Canada. (See **47 CFR 83.536 through 83.550**, chapter 2, for regulations.)

Mariners are reminded that the use of bridge-to-bridge voice communications in no way alters the obligation to comply with the provisions of the Navigation Rules, International-Inland.

CANADIAN GOVERNMENT AGENCIES PROVIDING MARITIME SERVICES

Canadian Coast Guard, Department of Transport, is charged with the responsibility for the safe navigation of vessels in Canadian waters. The Coast Guard maintains aids to navigation, operates maritime radio stations, operates weather and survey vessels, conducts marine research and icebreaking operations, lays and repairs submarine cables, and performs many of the same duties as its U.S. counterpart.

The Canadian Coast Guard carries out duties as the marine element of the Canadian Armed Forces search and rescue organization. In Canadian waters of the Great Lakes, search and rescue activities are controlled by a Rescue Coordination Center at Trenton, Ont. The center is alerted by Canadian Coast Guard radio stations or search and rescue units immediately upon receipt of a distress signal.

The Canadian Coast Guard publishes annually the Canadian Lists of Lights, Buoys, and Fog Signals. Radio Aids to Marine Navigation (issued March 1, June 1, and September 1 of each year), Notice to Mariners, Radio Broadcast Notice to Mariners, and Notices to Shipping are also issued by the Canadian Coast Guard.

Lists of Lights, Buoys, and Fog Signals and Radio Aids to Marine Navigation are available from Canadian Government Publishing Centre or Canadian Hydrographic Chart Distribution Office. Notices to Mariners are available from Director, Aids and Waterways, Canadian Coast Guard. Notices to Shipping are broadcast from Canadian Coast Guard radio stations; those in effect for an extended time are published in the form of a circular available from the Canadian Coast Guard Traffic Centre. (See appendix for addresses.)

Canadian Hydrographic Service, Department of Fisheries and Oceans, publishes nautical charts and other related marine publications, Canadian Sailing Directions (including Great Lakes, Volumes I and II, and Gulf and River St. Lawrence), Small Craft Guides, and the Catalogs of Nautical Charts and Related Publications. These publications are available from the Canadian Hydrographic Chart Distribution Office and all but the latter are available from the Canadian Government Publishing Centre. (See appendix for addresses.)

The Canadian Hydrographic Service, in conjunction with other components of the Department of Fisheries and Oceans and the Department of the Environment, provides data for several periodic bulletins containing water level information, including the Water Levels-Daily Means, and the Monthly Water Level Bulletin, Great Lakes and Montreal Harbour. These publications are available from Canadian Hydrographic Chart Distribution Office and Canadian Government Publishing Centre. (See appendix for addresses.)

Atmospheric Environment Service, Department of the Environment, issues forecasts and severe weather warnings for Lakes Ontario, Erie, Huron, and Superior, and for Georgian Bay. These forecasts are broadcast in code from Canadian Coast Guard marine radio stations, and in plain language by many Canadian commercial radio stations. Coast Guard broadcast schedules and contents are contained in the publication Radio Aids to Marine Navigation (Atlantic and Great Lakes) available from the Canadian Hydrographic Chart Distribution Office and the Canadian Government Publishing Centre. (See appendix for addresses.) Numerous Canadian vessels including year-round research vessels, lighthouse stations, and automatic reporting stations take weather observations and provide reports during the shipping season. These reports are broadcast over the same radio channels as the weather forecasts.

Canadian Customs.–Foreign pleasure craft may enter Canada temporarily on condition that they are exported at the end of the visit or boating season. Craft remaining in Canada beyond the end of the visit or season are subject to duty and taxes.

The owner or operator of a craft arriving from a foreign port or place is to report immediately to the nearest Canadian Customs unit. Only the owner or operator is permitted to go ashore to make the report; all passengers and goods must remain on board until the formalities have been completed.

At vessel reporting stations where a customs inspector is on duty during the boating season, the vessel is cleared and a permit is issued. At other stations, a telephone reporting system is used. The owner or operator telephones the nearest customs office, or calls 1-800-267-0976, toll free. After routine questioning, the inspector may issue a verbal clearance, or if inspection is necessary, the inspector will proceed to the vessel. These reporting stations display a sign indicating the telephone numbers. The telephone calls are recorded to provide proof of the vessel report. The hours of service vary from location to location as well as seasonally. A service charge is made for service requested outside the normal working hours. Transportation charges for the inspector may be assessed.

A nonresident may be permitted to keep his/her craft in Canada during the off season to have legitimate repairs or maintenance done by a bona fide marina or service depot. The owner must provide a copy of the work order or a written statement from the individual or firm making the repairs.

Additional information on Canadian Customs regulations may be obtained at the nearest Customs office. (See appendix for a list of Canadian Customs regional offices and addresses.)

Canadian Code of Navigating Practices and Procedures.–A code of Navigating Practices and Procedures, issued by the Department of Transport, establishes a set of nonregulatory standards for the conduct of ships in Canadian waters and fishing zones. Copies of the Code are available from the Canadian Hydrographic Chart Distribution Office. (See appendix for address.)

2. NAVIGATION REGULATIONS

This chapter contains Government regulations of the United States and Canada that are of most importance in the areas covered by Coast Pilot 6. The U.S. regulations are from the **Code of Federal Regulations (CFR)**, principally from Title 33, and extracts from Titles 21, 36, 40, 46, and 47. Selected Canadian regulations are included at the end of this chapter.

Note.–These regulations can only be amended by the enforcing agency or other authority cited in the regulations. Accordingly, requests for changes to these regulations should be directed to the appropriate agency for action. In those regulations where the enforcing agency is not cited or is unclear, recommendations for changes should be directed to the following Federal agencies for action: Food and Drug Administration (21 CFR 1250); U.S. Coast Guard (33 CFR 26, 92, 110, 117, 160, 161, 162, 164, and 165; 46 CFR 401); U.S. Army Corps of Engineers (33 CFR 207 and 334); Saint Lawrence Seaway Development Corporation (33 CFR 401); National Park Service (36 CFR 1, 2, and 7); Environmental Protection Agency (40 CFR 140); Federal Communications Commission (47 CFR 83).

Title 21–Food and Drugs

Part 1250–Interstate Conveyance Sanitation

§1250.93 Discharge of Wastes. Vessels operating on freshwater lakes or rivers shall not discharge sewage, or ballast or bilge water, within such areas adjacent to domestic water intakes as are designated by the Surgeon General.

Title 33–Navigation and Navigable Waters

Part 26–Vessel Bridge-to-Bridge Radiotelephone Regulations

§26.01 Purpose.

(a) The purpose of this part is to implement the provisions of the Vessel Bridge-to-Bridge Radiotelephone Act. This part–

(1) Requires the use of the vessel bridge-to-bridge radiotelephone;

(2) Provides the Coast Guard's interpretation of the meaning of important terms in the Act;

(3) Prescribes the procedures for applying for an exemption from the Act and the regulations issued under the Act and a listing of exemptions.

(b) Nothing in this part relieves any person from the obligation of complying with the rules of the road and the applicable pilot rules.

§26.02 Definitions.

For the purpose of this part and interpreting the Act–

"Secretary" means the Secretary of the Department in which the Coast Guard is operating;

"Act" means the "Vessel Bridge-to-Bridge Radiotelephone Act", 33 U.S.C. section 1201-1208;

"Length" is measured from end to end over the deck excluding sheer;

"Power-driven vessel" means any vessel propelled by machinery; and

"Towing vessel" means any commercial vessel engaged in towing another vessel astern, alongside, or by pushing ahead.

§26.03 Radiotelephone required.

(a) Unless an exemption is granted under §26.09 and except as provided in paragraph (a)(4) of this section, section 4 of the Act provides that–

(1) Every power-driven vessel of 300 gross tons and upward while navigating;

(2) Every vessel of 100 gross tons and upward carrying one or more passengers for hire while navigating;

(3) Every towing vessel of 26 feet or over in length while navigating; and

(4) Every dredge and floating plant engaged in or near a channel or fairway in operations likely to restrict or affect navigation of other vessels: Provided, That an unmanned or intermittently manned floating plant under the control of a dredge need not be required to have separate radiotelephone capability; Shall have a radiotelephone capable of operation from its navigational bridge, or in the case of a dredge, from its main control station, and capable of transmitting and receiving on the frequency or frequencies within the 156-162 Mega-Hertz band using the classes of emissions designated by the Federal Communications Commission, after consultation with other cognizant agencies, for the exchange of navigational information.

(b) The radiotelephone required by paragraph (a) of this section shall be carried on board the described vessels, dredges, and floating plants upon the navigable waters of the United States inside the lines established pursuant to section 2 of the Act of February 19, 1895 (28 Stat. 672), as amended.

§26.04 Use of the designated frequency.

(a) No person may use the frequency designated by the Federal Communications Commission under section 8 of the Act, 33 U.S.C.A. section 1207(a), to transmit any information other than information necessary for the safe navigation of vessels or necessary tests.

(b) Each person who is required to maintain a listening watch under section 5 of the Act shall, when necessary, transmit and confirm, on the designated frequency, the intentions of his vessel and any other information necessary for the safe navigation of vessels.

(c) Nothing in these regulations may be construed as prohibiting the use of the designated frequency to communicate with shore stations to obtain or furnish information necessary for the safe navigation of vessels.

Note.–The Federal Communications Commission has designated the frequency 156.65 MHz for the use of bridge-to-bridge radiotelephone stations.

§26.05 Use of radiotelephone.

Section 5 of the Act states–

(a) The radiotelephone required by this Act is for the exclusive use of the master or person in charge of the vessel, or the person designated by the master or person in charge of the vessel, or the person designated by the master or person in charge to pilot or direct the movement of the vessel, who shall maintain a listening watch on the designated frequency. Nothing contained herein shall be interpreted as precluding the use of portable radiotelephone equipment to satisfy the requirements of this Act.

§26.06 Maintenance of radiotelephone; failure of radiotelephone.

Section 6 of the Act states–

(a) Whenever radiotelephone capability is required by this Act, a vessel's radiotelephone equipment shall be maintained in effective operating condition. If the radiotelephone equipment carried aboard a vessel ceases to operate, the master shall exercise due diligence to restore it or cause it to be restored to effective operating condition at the earliest practicable time. The failure of a vessel's radiotelephone equipment shall not, in itself, constitute a violation of this Act, nor shall it obligate the master of any vessel to moor or anchor his vessel; however, the loss of radiotelephone capability shall be given consideration in the navigation of the vessel.

§26.07 English language.

No person may use the services of, and no person may serve as a person required to maintain a listening watch under section 5 of the Act, U.S.C. 1204 unless he can speak the English language.

§26.08 Exemption procedures.

(a) Any person may petition for an exemption from any provision of the Act or this part;

(b) Each petition must be submitted in writing to U.S. Coast Guard (G-W), 2100 Second Street SW., Washington, DC 20593, and must state–

(1) The provisions of the Act or this part from which an exemption is requested; and

(2) The reasons why marine navigation will not be adversely affected if the exemption is granted and if the exemption relates to a local communication system how that system would fully comply with the intent of the concept of the Act but would not conform in detail if the exemption is granted.

§26.09 List of exemptions.

(a) All vessels navigating on those waters governed by the navigation rules for Great Lakes and their connecting and tributary waters (33 U.S.C. 241 et seq.) are exempt from the requirements of the Vessel Bridge-to-Bridge Radiotelephone Act and this part until May 6, 1975.

(b) Each vessel navigating on the Great Lakes as defined in the Inland Navigational Rules Act of 1980 (33 U.S.C. 2001 et seq.) and to which the Vessel Bridge-to-Bridge Radiotelephone Act (33 U.S.C. 1201-1208) applies is exempt from the requirements in 33 U.S.C. 1203, 1204, and 1205 and the regulations under §§26.03, 26.04, 26.05, 26.06, and 26.07. Each of these vessels and each person to whom 33 U.S.C. 1208(a) applies must comply with Articles VII, X, XI, XII, XIII, XV, and XVI and Technical Regulations 1-7 of "The Agreement Between the United States of America and Canada for Promotion of Safety on the Great Lakes by Means of Radio, 1973."

§26.10 Penalties.

Section 9 of the Act states–

(a) Whoever, being the master or person in charge of a vessel subject to the Act, fails to enforce or comply with the Act or the regulations hereunder; or whoever, being designated by the master or person in charge of a vessel subject to the Act to pilot or direct the movement of a vessel fails to enforce or comply with the Act or the regulations hereunder-is liable to a civil penalty of not more than $500 to be assessed by the Secretary.

(b) Every vessel navigated in violation of the Act or the regulations hereunder is liable to a civil penalty of not more than $500 to be assessed by the Secretary, for which the vessel may be proceeded against in any District Court of the United States having jurisdiction.

(c) Any penalty assessed under this section may be remitted or mitigated by the Secretary, upon such terms as he may deem proper.

Part 110–Anchorage Regulations

§110.1 General.

(a) The areas described in Sub-part A of this part are designated as special anchorage areas pursuant to the authority contained in an act amending laws for preventing collisions of vessels approved April 22, 1940 (54 Stat. 150); Article 11 of section 1 of the act of June 7, 1897, as amended (30 Stat. 98; 33 U.S.C. 180), Rule 9 of section 1 of the act of February 8, 1895, as amended (28 Stat. 647; 33 U.S.C. 258), and Rule Numbered 13 of section 4233 of the Revised Statutes as amended (33 U.S.C. 322). Vessels not more than 65 feet in length, when at anchor in any special anchorage area, shall not be required to carry or exhibit the white anchor lights required by the Navigation Rules.

(b) The anchorage grounds for vessels described in Subpart B of this part are established, and the rules and regulations in relation thereto adopted, pursuant to the authority contained in section 7 of the act of March 4, 1915, as amended (38 Stat. 1053; 33 U.S.C. 471).

(c) All bearings in the part are referred to true meridian.

Subpart A–Special Anchorage Areas

§110.8 Lake Champlain, N.Y. and Vt.

(a) Ticonderoga, N.Y. An area shoreward of a line bearing 312° from Ticonderoga Light to the southeast corner of the New York State Boat Launching Ramp.

(b) Essex, N.Y. A small cove at the westerly side of Lake Champlain, shoreward of a line connecting the offshore ends of two promontories located at Essex.

(c) Shelburne, Vt. An area shoreward of a line bearing 142° from the eastern point of Collymer Pt. to Allen Hill.

(c-1) Shelburne Bay. Beginning at a point on the shoreline at latitude 44°25′53.0″N., longitude 73°14′47.3″W.; thence north to a point at latitude 44°26′04.8″N., longitude 73°14′46.6″W.; thence northwesterly to a point on the shoreline at latitude 44°26′06.9″N., longitude 73°14′50.2″W.; thence along the shoreline to the point of beginning.

(c-2) Shelburne Bay Allen Hill to La Platte River. That portion of the waters of Shelburne Bay west of the line from a point at Allen Hill at latitude 44°24′35″N., longitude 73°14′14″W.; to a point near the mouth of the La Platte River at latitude 44°24′03″N., longitude 73°14′05″W.

Note.–The anchoring of vessels and placement of temporary moorings in the anchorage area described in paragraph (c-2) of this section are administered by the Harbormaster appointed by the Town of Shelburne, Vermont.

(d) Mallets Bay, Vt. The southwesterly portion of Mallets Bay, south of Coates Island and west of a line bearing 170° from the most easterly point of Coates Island to the mainland.

(e) Mallets Bay, Vt. An area in the northwesterly portion of Mallets Bay, south of a line extending from the northeasterly end of Mallets Head to the northeasterly end of Marble Island, and west of a line extending from the northeasterly end of Marble Island to the northeasterly side of Cave Island, and southerly to the point on the lower east side of Mallets Head.

(f) St. Albans Bay, Vt. An area in the northerly portion of St. Albans Bay westward of the State Pier at St. Albans Bay State Park, northeasterly of a line bearing 296°30′ from the southwesterly corner of the State Pier, and southeasterly of a line parallel to and 500 feet west of the west side of the State Pier.

§110.77a Duluth-Superior Harbor, Duluth, Minn.

The area adjacent to Park Point in Duluth-Superior Harbor within the following boundaries: beginning at latitude 46°45′19.3″N., longitude 92°04′43″W.; thence to latitude 46°45′11.7″N., longitude 92°05′01″W.; thence to latitude 46°44′21.2″N., longitude 92°04′15.7″W.; thence to latitude 46°44′29.4″N., longitude 92°03′57.5″ W.; thence to the point of beginning.

§110.78 Sturgeon Bay, Sturgeon Bay, Wis.

(a) Area 1. Beginning at a point bearing 126°, 3,000 feet from the fixed green Sturgeon Bay Canal Leading Light mounted on the highway bridge; thence 120°, 1,200 feet, this line being parallel to and 150 feet from the channel edge; thence 222°, 500 feet; thence 300°, 1,200 feet; thence 042°, 500 feet to the point of beginning.

(b) Area 2. Beginning at a point 160 feet from the shoreline and on the east line of 15th Avenue extended; thence south 530 feet to a point 100 feet from the northern edge of the channel; thence southeasterly 2,350 feet along a line parallel to the northern edge of the channel to a point on the east line of 18th Avenue extended, using that portion of 18th Avenue that runs in a true north-south direction perpendicular to Utah Street; thence north 530 feet along this line of 18th Avenue extended to a point approximately 400 feet from the shoreline; thence northwesterly 2,350 feet along a line parallel to the northern edge of the channel to the point of beginning.

§110.79a Neenah Harbor, Neenah, Wis.

(a) Area 1. The area of Neenah Harbor south of the main shipping channel within the following boundary: A line beginning at a point bearing 117.5°, 1,050 feet from the point where the southeasterly side of the First Street/Oak Street Bridge crosses the south shoreline of the river; thence 254°, 162 feet; thence 146°, 462 feet; 164°, 138 feet; 123°, 367 feet; 068°, 400 feet; 044°, 400 feet; thence 320°, 107 feet; thence 283°, 1,054 feet to the point of beginning.

(b) Area 2. Commencing at a point where the west line of Second Street extended meets the north edge of the harbor, thence south to intersect the north edge of the channel at latitude 44°11′04.2″N., longitude 88°27′13.2″W., thence northwesterly to a point at latitude 44°11′06.3″N., longitude 88°27′16.4″W., thence north to the easterly end of the Neenah Dam Spillway.

Note.–An ordinance of the city of Neenah, Wis., requires approval of the Neenah Police Department for the location and type of individual moorings placed in this special anchorage area.

§110.79b Millers Bay, Lake Winnebago, Oshkosh, Wis.

The area adjacent to Menominee Park in Millers Bay within the following boundaries: beginning at latitude 44°01′47″N., longitude 88°31′05″W.; thence to latitude 44°01′46″N., longitude 88°31′00″W.; thence to latitude 44°01′34″N., longitude 88°31′04″W.; thence to latitude 44°01′36″N., longitude 88°31′08″W.; thence to point of beginning.

§110.79c Fish Creek Harbor, Fish Creek, Wis.

The area within the following boundaries: Beginning at latitude 45°07′58″N., longitude 87°14′41″W.; thence to latitude 45°07′58″N., longitude 87°14′35″W.; thence to latitude 45°07′50″N., longitude 87°14′30″W.; thence to latitude 45°07′47″N., longitude 87°14′38″W.; thence to the point of beginning.

§110.80 Milwaukee Harbor, Milwaukee, Wis.

(a) McKinley Park. The water area east of McKinley Park enclosed by a line beginning at McKinley Park Jetty Light; thence 090° 500 feet to a point on the breakwater; thence northerly and northwesterly following the breakwater, piers, jetty and natural shoreline to the point of beginning.

(b) South Shore Park. The water area northeast of South Shore Park enclosed by a line beginning at the northeast corner of the jetty at latitude

43°00′07.5″N., longitude 87°53′08″W.; thence to latitude 43°00′05″N., longitude 87°53′01″W.; thence to latitude 42°59′55″N., longitude 87°52′53″W.; thence to latitude 42°59′40″N., longitude 87°52′33.5″W.; thence to a point of the shoreline at latitude 42°59′34″N., longitude 87°52′43.5″W.; thence following the shoreline to the point of beginning.

(c) Bay View Park. The water area east of Bay View Park enclosed by a line beginning on the shoreline at latitude 42°59′28.5″N., longitude 87°52′35″W.; thence to latitude 42°59′35.5″N., longitude 87°52′27″W.; thence to latitude 42°59′08″N., longitude 87°51′37″W.; thence to a point on the shoreline at latitude 42°58′59″N., longitude 87°51′46″W.; thence following the shoreline to the point of beginning.

Note.–An ordinance of the City of Milwaukee, Wisconsin requires the approval of the Milwaukee Harbor Master for the location and type of moorings placed in these special anchorage areas.

§110.80a Lake Macatawa, Mich.

An area located on the south side of Lake Macatawa near the entrance to Lake Michigan, shoreward (south) of a line commencing offshore of Macatawa Park at a point 960 feet S 156° E from the light on the south pier at the entrance to the Lake, and extending 1,550 feet N 82° E toward the northwest corner of the Macatawa Bay Yacht Club pier.

§110.80b Marquette Harbor, Marquette, Mich.

The area within Marquette Harbor beginning at latitude 46°32′38″N., longitude 87°22′46″W.; thence to latitude 46°32′37″N., longitude 87°22′54″W.; thence to latitude 46°32′33″N., longitude 87°22′54″W.; thence to latitude 46°32′33″N., longitude 87°22′46″W.; thence to point of origin.

Note.–An ordinance of the City of Marquette authorizes the Harbormaster to direct the location and length of time any watercraft may anchor in this area.

§110.81 Muskegon Lake, Michigan.

(a) Muskegon Lake West. The waters of the southwest side of Muskegon Lake enclosed by a line beginning at latitude 43°13′24″N., longitude 86°19′18.5″W.; thence 145°T to latitude 43°13′07.5″N., longitude 86°19′02.5″W.; thence 230°T to latitude 43°13′04″N., longitude 86°19′08.5″W.; thence along the shoreline to the point of origin.

(b) Muskegon Lake East. The waters of the southeast side of Muskegon Lake enclosed by a line beginning at latitude 43°14′04″N., longitude 86°15′47″W.; thence 277°T to latitude 43°14′06.5″N., longitude 86°16′27″W.; thence 205°T to the shore; thence along the shoreline to the point of origin.

Note.–Administration of the Special Anchorage Area is exercised by the City of Muskegon pursuant to local ordinances.

§110.81a Lake Betsie, Frankfort, Mich.

The area within the following boundaries:

Beginning at latitude 44°37′47″ North, longitude 86°13′52.5″ West; thence to latitude 44°37′51.4″ North, longitude 86°13′49″ West; thence to latitude 44°37′46.4″ North, longitude 86°13′37.8″ West; thence to latitude 44°37′44.2″ North, longitude 86°13′37.8″ West; thence to latitude 44°37′44.8″ North, longitude 86°13′44.2″ West; thence to point of beginning.

§110.82 Charlevoix Harbor, Mich.

The waters on the north side of Round Lake northward of a line beginning at a point approximately 200 feet south of the north shore bearing 60°, 280 feet, from the northeast east corner of the Charlevoix Municipal Wharf, and bearing thence 92°, 400 feet, thence 129°, 1,160 feet, and thence 110° to the westerly end of the southwest side of Park Island.

§110.82a Little Traverse Bay, Lake Michigan, Harbor Springs, Mich.

(a) Area 1. Beginning at latitude 45°25′42.2″N., longitude 84°59′7.5″W.; thence to latitude 45°25′39.5″N., longitude 84°59′09″W.; thence to latitude 45°25′35″N., longitude 84°59′07″W.; thence to latitude 45°25′35″N., longitude 84°58′55.2″W.; thence to latitude 45°25′42.2″N., longitude 84°58′58.5″W.; thence to point of beginning.

(b) Area 2. Beginning at latitude 45°25′42.2″N., longitude 84°58′54″W.; thence to latitude 45°25′35″N., longitude 84°58′53″W.; thence to latitude 45°25′35″N., longitude 84°58′24.8″W.; thence to latitude 45°25′36.1″N., longitude 84°58′23″W.; thence to latitude 45°25′42.2″N., longitude 84°58′39″W., thence to point of beginning.

§110.83 Chicago Harbor, Ill.

(a) Grant Park North-A. Beginning at a point 2,120 feet South of the Intersection of the North line of the Chicago Yacht Club bulkhead, as constructed in 1927, and the harbor line approved by the Department of the Army on August 3, 1940, along the West side of the harbor, said harbor line runs parallel to the overall alignment of said Grant Park bulkhead between its North and South ends, said intersection is approximately 800 feet South of the South face of the former Naval Armory Dock, and 100 feet East of said bulkhead, that point being approximately on the harbor line; thence North along a straight line parallel to said harbor line and bulkhead, 1,705 feet to a point that is 100 feet East of said harbor line and 150 feet East of the Grant Park bulkhead; thence East at a right angle, 150 feet; thence North at a right angle, parallel to the first described line, passing 100 feet East of the Chicago Yacht Club bulkhead, 440 feet; thence Northeasterly 850 feet to a point 1,070 feet East of the aforesaid Grant Park bulkhead; thence Southeasterly 740 feet to a point 1,600 East of said harbor line; thence Southerly 1,960 feet to a point approximately 1,555 feet East of said harbor line and about 1,560 feet East of said Grant Park bulkhead; thence Southwesterly 295 feet to a point 1,180 feet due East, in a direction perpendicular to the West line hereof, from the point of beginning; and thence West to the point of beginning.

(b) Grant Part North-B. Beginning at a point 145 feet North of the North line of the Chicago Yacht Club bulkhead, as constructed in 1927, and 320 feet

East of the harbor line approved by the Department of the Army on August 3, 1940, along the West side of the harbor, said Chicago Yacht Club bulkhead extends due East, perpendicular to the Grant Park bulkhead's overall alignment between its North and South ends, said bulkhead runs parallel to the aforesaid harbor line and is approximately 800 feet South of the South face of the former Naval Armory Dock, said point is 20 feet East of the East face of the Chicago Park District jetty; thence North parallel to said jetty, 230 feet to a point 20 feet South of the South face of the Lake Shore Drive bulkhead, said bulkhead runs Easterly and Westerly in a curved direction; thence Easterly along a line parallel to said curved bulkhead to a point 20 feet Southwest and perpendicular to a line extended along the Southwest side of the Columbia Yacht Club pier to said curved bulkhead; thence Southeasterly parallel to said extended line, 160 feet; thence Southwesterly to the point of beginning.

(c) Grant Park North-C. Beginning at a point 970 feet North of the North line of the Chicago Yacht Club bulkhead, as constructed in 1927, which extends due East and perpendicular from the harbor line approved by the Department of the Army on August 3, 1940, said Chicago Yacht Club bulkhead line is appoximately 800 feet South of the South face of the former Naval Armory Dock, and 1,170 feet East of said harbor line, said point of beginning is 20 feet East of the East face of the Columbia Yacht Club pier and 20 feet South of the South face of a breakwater, which runs in an East and West direction; thence East along a line parallel to the South face of said East-West breakwater, 540 feet to a point 20 feet West of the West face of a breakwater, which runs in a North and South direction; thence South along a line parallel to the West face of said North-South breakwater, approximately 965 feet; thence Northwesterly to a point 20 feet Southeast and perpendicular to the Southeast side of the aforesaid Columbia Yacht Club pier; thence Northerly along a line parallel to the East face of said pier to the point of beginning.

(d) Grant Park South. Beginning at a point 2,220 feet South of the intersection of the North line of the Chicago Yacht Club bulkhead, as constructed in 1927, and the harbor line approved by the Department of the Army on August 3, 1940, along the West side of the harbor, said harbor line runs parallel to the overall alignment of the Grant Park bulkhead between its North and South ends, said intersection is approximately 800 feet South of the South face of the former Naval Armory Dock, and 100 feet East of said Grant Park bulkhead, that point being approximately on the harbor line; thence East, perpendicular to the overall alignment of the Grant Park bulkhead, and perpendicular to said harbor line, 1,180 feet; thence Southeasterly 330 feet to a point 1,510 feet East of said Grant Park bulkhead and 225 feet South of an extension of the first described line; thence South perpendicular to the first described line, 220 feet; thence Southwesterly 2,375 feet along a line generally 100 feet Northwesterly from and parallel to the Northwesterly face of the narrow section of the U.S. Inner Breakwater; thence Northwesterly 100 feet to a point 150 feet East of said Grant Park bulkhead (or 100 feet East of the aforesaid harbor line), and 4,570 feet South of the North line of the aforesaid Chicago Yacht Club bulkhead; and thence North 2,350 feet of the point of beginning.

Note.–The Chicago Park District controls the location and type of any moorings placed in the special anchorage areas in this section.

§110.83a Cedar Point, Sandusky, Ohio.

The water area enclosed by the break wall beginning at latitude 41°28'13"N., longitude 82°40'39" W.; thence along the break wall to latitude 41°28'21"N., longitude 82°40'53"W.; thence along a straight line southwesterly to latitude 41°28'20"N., longitude 82°40'55"W.; thence along the break wall to latitude 41°28'33"N., longitude 82°40'58"W.; thence along the shoreline to the point of beginning.

§110.84 Black Rock Channel opposite foot of Porter Avenue, Buffalo, New York.

An area extending northwesterly between Black Rock Channel and Bird Island Pier opposite the foot of Porter Avenue, bounded as follows: Beginning at Triangulation Marker "N-5" on Bird Island Pier; thence southeasterly along the pier a distance of approximately 745 feet; thence 60°52' true, approximately 300 feet to a point 50 feet westerly of the westerly limit of Black Rock Channel; thence northwesterly along an arc of a circle parallel to and 50 feet westerly of the westerly limit of the channel to a point approximately 360 feet southerly of Bird Island Pier Light No. 17; thence 276°20' true, approximately 135 feet to Bird Island Pier; thence southwesterly and southerly along the pier a distance of approximately 1,355 feet to the point of beginning.

§110.84a Put-In-Bay, Ohio.

The area in Put-In-Bay, Ohio commencing at a point 283° true 450 feet from Put-In-Bay Dock Light; thence 008°, 850 feet; thence 254°, 900 feet; thence 193°, 400 feet; thence 126°, 420 feet; thence 085°, 500 feet to the point of origin. The area is further divided into two areas. Area I lies east of and Area II lies west of the line commencing at the southwest corner adjacent to Put-In-Bay Buoy 4 running 013° to the mid-point of the northern boundary.

Note.–Area I is for boats anchoring using their own anchoring gear excluding mooring buoys; Area II is for boats using their own anchoring gear and boats moored to authorized mooring buoys. Authorization for placement of mooring buoys in Area II is required from the District Engineer, U.S. Army Corps of Engineers, Box 1027, Detroit, Michigan.

§110.84b Buffalo, N.Y.

The area within the Port of Buffalo known as Port of Buffalo Small Boat Harbor commencing at a point on shore at latitude 42°51'05"N., longitude 78°51'55"W.; thence 240° to riprap dike thence following the dike to the shoreline; thence along the shoreline to the point of origin.

§110.85 Niagara River, Youngstown, N.Y.

(a) Area 1. Beginning at a point at the intersection of the south line of Swain Street extended with the east shoreline of the Niagara River at latitude 43°14'33"N., longitude 79°03'7.5"W.; thence westerly to a point at latitude 43°14'33"N., longitude 79°03'9.5"W.; thence southerly to a point at latitude 43°14'15.5"N., longitude 79°03'10"W.; thence westerly to a point at latitude 43°14'15.5"N., longitude 79°03'17"W.; thence northerly to a point at latitude 43°14'54.5"N., longitude 79°03'14"W.; thence southeasterly to a point at latitude 43°14'52.3"N., longitude 73°03'09"W.; thence southerly to a point at latitude 43°14'51.4"N., longitude 73°03'09"W.; thence easterly to a point at latitude 43°14'51.5"N.; longitude 79°03'6.5"W.; thence along the shoreline to the point of beginning.

(b) Area 2. Beginning at a point at latitude 43°14'53.2"N., longitude 79°03'08"W.; thence northwesterly to a point at latitude 43°14'56"N., longitude 79°03'14"W.; thence northerly to a point at latitude 43°15'07"N., longitude 79°03'13"W.; thence northwesterly to a point at latitude 43°15'9.5"N., longitude 79°03'13.5"W.; thence southeasterly to a point at latitude 43°15'7.5"N., longitude 79°03'08"W.; thence southerly to the point of beginning.

(c) Area 3. Beginning at a point at latitude 43°15'7.9"N., longitude 79°03'03"W.; thence westerly to a point at latitude 43°15'7.9"N., longitude 79°03'04"W.; thence northwesterly to a point at latitude 43°15'11.8"N., longitude 79°03'14"W.; thence northerly to a point at latitude 43°15'14"N., longitude 79°03'14"W.; thence northwesterly to a point at latitude 43°15'22"N., longitude 79°03'21.5"W.; thence northeasterly to a point at latitude 43°15'25.5"N., longitude 79°03'13"W.; thence along the shoreline to the point of beginning.

Note.–The Youngstown Harbor Commission controls the location, type, and assignment of moorings placed in the special anchorage areas in this section.

§110.86 Sodus Bay, New York.

The water area in Sodus Bay, New York, south of Sand Point beginning at a point on the shoreline at latitude 43°16'07"N., longitude 76°58'47"W.; thence southwesterly to latitude 43°15'55"N., longitude 76°59'00"W.; thence easterly to latitude 43°15'52"N., longitude 76°58'34"W.; thence northerly to a point on the shoreline at latitude 43°15'58"N., longitude 76°58'34"W.; thence along the natural shoreline and structures to the point of beginning.

Note.–An ordinance of Wayne County, New York, requires the permission of the Wayne County Sheriff before any vessel is moored or anchored in this special anchorage area.

§110.87 Henderson Harbor, New York.

(a) Area A. The area in the southern portion of Henderson Harbor west of the Henderson Harbor Yacht Club bounded by a line beginning at the point of land, approximately 150 feet west of the Graham Creek Range Rear Light; thence 180°, 50 feet; thence 275°, 810 feet; thence 000°, 1,500 feet; thence 090°, 700 feet; thence 177°, 1,250 feet to the point of land approximately 160 feet west of the Graham Creek Range Forward Light; thence along the shoreline to the point of beginning.

(b) Area B. The area in the southern portion of Henderson Harbor north of Graham Creek Entrance Light bounded by a line beginning at a point 000°, 1000 feet from Graham Creek Entrance Light; thence 357°, 1,200 feet; thence 090°, 400 feet; thence 172°, 1,200 feet; 090°, 500 feet; thence 177°, 1,200 feet; thence 270°, 500 feet to the point of beginning.

Note.–Permission must be obtained from the Town of Henderson Harbormaster before any vessel is moored or anchored in this special anchorage area.

Subpart B–Anchorage Grounds

§110.205 Chicago Harbor, Ill.

(a) The anchorage grounds–(1) Anchorage A, exterior breakwater. Southwest of a line parallel with and 150 feet southwestward of the exterior breakwater; west of a line parallel with and 150 feet west of the south extension of the exterior breakwater; northeast of a line parallel with and 1,500 feet southwestward of the exterior breakwater; and east of a line parallel with the south extension of the exterior breakwater and 500 feet eastward of the east face of the filtration plant.

(2) Anchorage B, south arm. West of a line parallel with and 150 feet west of the south arm of the exterior breakwater; north of a line perpendicular to the south arm at its south end; east of a line parallel with the south arm, about 2,200 feet therefrom and on line with the east face of the Municipal Pier; and south of a line perpendicular to the south arm 700 feet from its north end.

(3) Anchorage C, shore arm. South of a line parallel with and 150 feet southward of the shore arm of the exterior breakwater; west of a line parallel with the south extension of the exterior breakwater, 100 feet westward of the east end of the shore arm; northwest of a line perpendicular to the Lake Shore Drive revetment and 300 feet northwest of the northwest corner of the filtration plant; and east of a line parallel with and 600 feet lakeward of the Lake Shore Drive revetment.

(4) Anchorage D, Chicago Harbor Lock South. Beginning at a point 35.5 feet South (16 feet South of the South face of the Southeast guidewall) and 28.0 feet West of the SE Guide Wall Light; thence Westerly and parallel to the guidewall 800 feet to a point that is 16 feet South of the South face of the Southeast guidewall; thence Southerly 80 feet to a point that is 96 feet South of the South face of the Southeast guidewall; thence Easterly 800 feet to a point that is 96 feet South of the south face of the southeast guidewall; thence Northerly 80 feet to the point of beginning.

(5) Anchorage E, Chicago Harbor Lock North. Beginning at a point 156.75 feet North (16 feet North of the North face of the Northeast guidewall) and 590 feet West of the SE Guidewall Light; thence Westerly and parallel to the guidewall 600 feet to a point that is 16 feet North of the North face of the Northeast guidewall; thence Northerly 80 feet to a

point that is 96 feet North of the North face of the Northeast guidewall; thence Easterly 600 feet to a point that is North of the the North face of the Northeast guidewall; thence Southerly 80 feet to the point of beginning.

(b) The rules and regulations. (1) Except in cases of emergency, no vessel may be anchored in Chicago Harbor outside of the anchorage grounds in paragraph (a) of this section or the special anchorage areas prescribed in §110.83.

(2) Anchors must not be placed outside the anchorage areas, nor shall any vessel be so anchored that any portion of the hull or rigging shall at any time extend outside the boundaries of the anchorage area.

(3) Any vessel anchoring under circumstances of great emergency outside of the anchorage areas must be placed near the edge of the channel and in such position as not to interfere with the free navigation of the channel nor obstruct the approach to any pier nor impede the movement of any boat, and shall move away immediately after the emergency ceases, or upon notification by the Captain of the Port.

(4) The maneuvering of a vessel by means of a dragged anchor, except within an established anchorage ground or in stress of weather or to avoid collision, is prohibited. Unnecessary maneuvering in any of the anchorage grounds is prohibited.

(5) The directions of the Captain of the Port assigning vessels to parts of the anchorage grounds suitable to their draft, requiring vessels to anchor bow and stern, requiring shifting the anchorage of any vessel within any anchorage ground for the common convenience, or for otherwise enforcing this section, shall be promptly executed by owners, masters, and persons in charge of vessels.

(6) Nothing in this section shall be construed as relieving the owner or person in charge of any vessel from the penalties of the law for obstructing navigation or for obstructing or interfering with range lights, or for not complying with the navigation laws in regard to lights, fog signals, or for otherwise violating law.

(7) No vessel may use anchorages A, B, D, and E except commercial vessels operated for profit. No person may place floats or buoys for marking moorings or anchors in place in anchorages A and B. No person may place fixed mooring piles or stakes in anchorages A and B. (Mooring facilities are available adjacent to the lakeside guidewalls of the Chicago Harbor Lock in anchorages D and E.) All vessels using anchorages D and E shall moor against pile clusters adjacent to the respective anchorage.

Any time barges are moored in anchorage D or E, a manned towing vessel shall be present in one of these anchorages. Exceptions to this surveillance requirement are allowable for periods not to exceed one hour.

(8) No commercial vessels operated for profit that measure 50 gross tons or more may anchor in anchorage C. Temporary floats or buoys for marking moorings or anchors in place may be used in anchorage C. No person may place a fixed mooring pile or stake in anchorage C.

§110.207 Cleveland Harbor, Ohio.

(a) The anchorage grounds-(1) West anchorage. The northwesterly portion of the West Basin between the northwest limits of the West Basin and a line parallel to and 1,050 feet distant from the West Breakwater; and from the southwest limits of the West Basin to a line perpendicular to the West Breakwater, 2,050 feet southwesterly along the West Breakwater from Cleveland West Breakwater Light.

(2) East anchorage. The southeasterly portion of the East Basin between the mainland and a line parallel to and 1,250 feet distant from the East Breakwater; from opposite Cleveland East Entrance Light to a due north line passing through the flashing white light on the Allied Oil Company dock.

Note.-The westerly limit of the anchorage area is no longer marked by the Allied Oil Company dock light. The line defined lies approximately on meridian 81°40′34″.

(3) Explosives anchorage. In Lake Erie, northwest of Cleveland Harbor East Breakwater, and including a rectangular area marked by four white spar buoys at the following true bearings and distances from Cleveland East Pierhead Light: 38°30′, 2,050 feet; 68°, 2,050 feet; 57°, 7,050 feet; and 49°, 7,050 feet.

(b) The regulations. (1) The west and east anchorages are general anchorages.

(2) Use of the explosives anchorage shall be subject to the supervision of the Captain of the Port.

§110.208 Buffalo Harbor, N.Y.

(a) The anchorage grounds-(1) Explosives Anchorage A. Inside the south section of the main breakwater 700 feet wide starting at a point 500 feet southerly from the south end of the north section and extending approximately 153° true 3,000 feet parallel to the line of the south section of the main breakwater.

Part 117-Drawbridge Operation Regulations

Subpart A-General Requirements

§117.1 Purpose.

This subpart prescribes general requirements relating to the use and operation of drawbridges across the navigable waters of the United States.

Note.-The primary jurisdiction to regulate drawbridges across the navigable waters of the United States is vested in the Federal Government. Laws, ordinances, regulations, and rules which purport to regulate these bridges and which are not promulgated by the Federal Government have no force and effect.

§117.3 Applicability.

The provisions of this subpart not in conflict with the provisions of Subpart B apply to each drawbridge.

Note.-For all of the requirements applicable to a drawbridge listed in Subpart B, one must review the requirements in Subpart A and §§117.51 through

117.99 of Subpart B, as well as the requirements in Subpart B applicable to the particular drawbridge in question.

§117.5 When the draw shall open.

Except as otherwise required by this subpart, drawbridges shall open promptly and fully for the passage of vessels when a request to open is given in accordance with this subpart.

§117.7 General duties of drawbridge owners and tenders.

(a) Drawbridge owners and tenders shall operate the draw in accordance with the requirement in this part.

(b) Except for drawbridges not required to open for the passage of vessels, owners of drawbridges shall ensure that:

(1) The necessary drawtenders are provided for the safe and prompt opening of the draw;

(2) The operating machinery of the draw is maintained in a serviceable condition; and

(3) The draws are operated at sufficient intervals to assure their satisfactory operation.

§117.9 Delaying opening of a draw.

No person shall unreasonably delay the opening of a draw after the signals required by §117.15 have been given.

Note.–Trains are usually controlled by the block method. That is, the track is divided into blocks or segments of a mile or more in length. When a train is in a block with a drawbridge, the draw may not be able to open until the train has passed out of the block and the yardmaster or other manager has "unlocked" the drawbridge controls. The maximum time permitted for delay is defined in Subpart B for each affected bridge. Land and water traffic should pass over or through the draw as soon as possible in order to prevent unnecessary delays in the opening and closure of the draw.

§117.11 Appurtenances unessential to navigation.

No vessel owner or operator shall signal a drawbridge to open for any nonstructural vessel appurtenance which is not essential to navigation or which is easily lowered.

§117.15 Signals.

(a) General. (1) The operator of each vessel requesting a drawbridge to open shall signal the drawtender and the drawtender shall acknowledge that signal. The signal shall be repeated until acknowledged in some manner by the drawtender before proceeding.

(2) The signals used to request the opening of the draw and to acknowledge that request shall be sound signals, visual signals, or radiotelephone communications described in this subpart.

(3) Any of the means of signaling described in this subpart sufficient to alert the bridge being signaled may be used.

(b) Sound signals. (1) Sound signals shall be made by whistle, horn, megaphone, hailer, or other device capable of producing the described signals loud enough to be heard by the drawtender.

(2) As used in this section, "prolonged blast" means a blast of four to six seconds duration and "short blast" means a blast of approximately one second duration.

(3) The sound signal to request the opening of a draw is one prolonged blast followed by one short blast sounded not more than three seconds after the prolonged blast. For vessels required to be passed through a draw during a scheduled closure period, the sound signal to request the opening of the draw during that period is five short blasts sounded in rapid succession.

(4) When the draw can be opened immediately, the sound signal to acknowledge a request to open the draw is one prolonged blast followed by one short blast sounded not more then 30 seconds after the requesting signal.

(5) When the draw cannot be opened immediately, or is open and shall be closed promptly, the sound signal to acknowledge a request to open the draw is five short blasts sounded in rapid succession not more than 30 seconds after the vessel's opening signal. The signal shall be repeated until acknowledged in some manner by the requesting vessel.

(c) Visual signals. (1) The visual signal to request the opening of a draw is–

(i) A white flag raised and lowered vertically; or

(ii) A white, amber, or green light raised and lowered vertically.

(2) When the draw can be opened immediately, the visual signal to acknowledge a request to open the draw, given not more than 30 seconds after the vessel's opening signal, is–

(i) A white flag raised and lowered vertically;

(ii) A white, amber, or green light raised and lowered vertically, or

(iii) A fixed or flashing white, amber, or green light or lights.

(3) When the draw cannot be opened immediately, or is open and must be closed promptly, the visual signal to acknowledge a request to open the draw is–

(i) A red flag or red light swung back and forth horizontally in full sight of the vessel given not more than 30 seconds after the vessel's opening signal; or

(ii) A fixed or flashing red light or lights given not more than 30 seconds after the vessel's opening signal.

(4) The acknowledging signal when the draw cannot open immediately or is open and must be closed promptly shall be repeated until acknowledged in some manner by the requesting vessel.

(d) Radiotelephone communications. (1) Radiotelephones may be used to communicate the same information provided by sound and visual signals.

(2) The vessel and the drawtender shall monitor the frequency used until the vessel has cleared the draw.

(3) When radiotelephone contact cannot be initiated or maintained, sound or visual signals under this section shall be used.

§117.17. Signalling for contiguous drawbridges.

When a vessel must pass two or more drawbridges close together, the opening signal is given for the first bridge. After acknowledgement from the first bridge that it will promptly open, the opening signal is given for the second bridge, and so on until all bridges that the vessel must pass have been given the opening signal and have acknowledged that they will open promptly.

§117.19 Signalling when two or more vessels are approaching a drawbridge.

When two or more vessels are approaching the same drawbridge at the same time, or nearly the same time, whether from the same or opposite directions, each vessel shall signal independently for the opening of the draw and the drawtender shall reply in turn to the signal of each vessel. The drawtender need not reply to signals by vessels accumulated at the bridge for passage during a scheduled open period.

§117.21 Signalling for an opened drawbridge.

When a vessel approaches a drawbridge with the draw in the open position, the vessel shall give the opening signal. If no acknowledgement is received within 30 seconds, the vessel may proceed, with caution, through the open draw.

§117.23 Installation of radiotelephones.

(a) When the District Commander deems it necessary for reasons of safety of navigation, the District Commander may require the installation and operation of a radiotelephone on or near a drawbridge.

(b) The District Commander gives written notice of the proposed requirement to the bridge owner.

(c) All comments the owner wishes to submit shall be submitted to the District Commander within 30 days of receipt of the notice under paragraph (b) of this section.

(d) If, upon consideration of the comments received, the District Commander determines that a radiotelephone is necessary, the District Commander notifies the bridge owner that a radiotelephone shall shall be installed and gives a reasonable time, not to exceed six months, to install the radiotelephone and commence operation.

§117.31 Closure of draw for emergency vehicles.

When a drawtender is informed by a reliable source that an emergency vehicle is due to cross the draw, the drawtender shall take all reasonable measures to have the draw closed at the time the emergency vehicle arrives at the bridge.

§117.33 Closure of draw of natural disasters or civil disorders.

Drawbridges need not open for the passage of vessels during periods of natural disasters or civil disorders declared by the appropriate authorities unless otherwise provided for in Subpart B or directed to do so by the District Commander.

§117.35 Operations during repair or maintenance.

(a) When operation of the draw must deviate from the regulations in this part for scheduled repair or maintenance work, the drawbridge owner shall request approval from the District Commander at least 30 days before the date of the intended change. The request shall include a brief description of the nature of the work to be performed and the times and dates of requested changes. The District Commander's decision is forwarded to the applicant within five working days of the receipt of the request. If the request is denied, the reasons for the denial are forwarded with the decision.

(b) When the draw is rendered inoperative because of damage to the structure or when vital, unscheduled repair or maintenance work shall be performed without delay, the drawbridge owner shall immediately notify the District Commander and give the reasons why the draw is or should be rendered inoperative and the expected date of completion of the repair or maintenance work.

(c) All repair or maintenance work under this section shall be performed with all due speed in order to return the draw to operation as soon as possible.

(d) If the operation of the draw will be affected for periods of less than 60 days, the regulations in this part will not be amended. Where practicable, the District Commander publishes notice of temporary deviations from the regulations in this part in the Federal Register and Local Notices to Mariners. If operation of the draw is expected to be affected for more than 60 days, the District Commander publishes temporary regulations covering the repair period.

§117.37 Opening or closure of draw for public interest concerns.

(a) For reasons of public health or safety or for public functions, such as street parades and marine regattas, the District Commander may authorize the opening or closure of a drawbridge for a specified period of time.

(b) Requests for opening or closure of a draw shall be submitted to the District Commander at least 30 days before the proposed opening or closure and include a brief description of the proposed event or other reason for the request, the reason why the opening or closure is required, and the times and dates of the period the draw is to remain open or closed.

(c) Approval by the District Commander depends on the necessity for the opening or closure, the reasonableness of the times and dates, and the overall effect on navigation and users of the bridge.

§117.39. Closure of draw due to infrequent use.

Upon written request by the owner or operator of a drawbridge, the District Commander may, after notice in the Federal Register and opportunity for public comment, permit the draw to be closed and untended due to infrequency of use of the draw by vessels. The District Commander may condition approval on the continued maintenance of the operating machinery.

§117.41 Maintenance of draw in fully open position.

The draw may be maintained in the fully open position to permit the passage of vessels and drawtender service discontinued if the District Commander is notified in advance. The draw shall remain in the fully open position until drawtender service is restored or authorization under §117.39 is given for the draw to remain closed and untended.

§117.43 Changes in draw operation requirements for regulatory purposes.

In order to evaluate suggested changes to the drawbridge operation requirements, the District Commander may authorize temporary deviations from the regulations in this part for periods not to exceed 60 days. Notice of these deviations is disseminated in the Local Notices to Mariners and published in the Federal Register.

§117.45 Operation during winter in the Great Lakes area.

(a) The Commander, Ninth Coast Guard District, may determine that drawbridges located in the Ninth Coast Guard District need not open during the winter season when general navigation is curtailed, unless a request to open the draw is given at least 12 hours before the time of the intended passage.

(b) Notice of these determinations is disseminated in Local Notices to Mariners and other appropriate media. Notices indicate–

(1) The name and location of the bridge affected;

(2) The period of time covered; and

(3) The telephone number and address of the party to whom requests for openings are given.

§117.47. CLearance gages.

(a) Clearance gages are required for drawbridges across navigable waters of the United States discharging into the Atlantic Ocean south of Delaware Bay (including the Lewes and Rehoboth Canal, DE) or into the Gulf of Mexico (including coastal waterways contiguous thereto and tributaries to such waterways and the lower Atchafalaya River, LA), except the Mississippi River and its tributaries and outlets.

(b) Clearance gages shall be approved by the concerned Coast Guard District Commander. They shall be installed on the upstream and downstream sides of each drawbridge by and at the expense of the owner or agency controlling the bridge. These gages shall be kept in good repair and in legible condition.

Note.–Clearance gage requirements, if any, for drawbridges other than those referred to in this section are listed in Subpart B under the appropriate bridge.

§117.49 Process of violations.

(a) Complaints of alleged violations under this part are submitted to the District Commander of the Coast Guard District in which the drawbridge is located.

(b) Penalties for violations under this part are assessed and collected under Subpart 1.07 of Part 1 of this chapter (not published in this Coast Pilot; see 33 CFR 1.07).

Subpart B–Specific Requirements

§117.51 Purpose.

This subpart prescribes specific requirements relating to the operation of certain drawbridges.

Note.–The drawbridges under this subpart are listed by the waterway they cross and by the state in which they are located. Waterways are arranged alphabetically by state. The drawbridges listed under a waterway are generally arranged in order from the mouth of the waterway moving upstream. The drawbridges on the Atlantic Intracoastal Waterway are listed from north to south and on the Gulf Intracoastal Waterway from east to west.

§117.53 Applicability.

(a) The requirements in this subpart apply to the bridges listed and are in addition to, or vary from, the general requirements in Subpart A.

(b) A requirement in this subpart which varies from a general requirement in Subpart A supersedes the general requirement.

(c) All other general requirements in Subpart A not at variance apply to the bridges listed in this subpart.

(d) The draws of a number of the bridges listed in this subpart need not open for the passage of vessels during certain periods, however, this does not preclude the bridge owner from directing the drawtender to open the draw during these periods.

§117.55 Posting of requirements.

(a) The owner of each drawbridge under this subpart, other than removable span bridges, shall ensure that a sign summarizing the requirements in this subpart applicable to the bridge is posted both upstream and downstream of the bridge. The requirements to be posted need not include those in Subpart A or §§117.51 through 117.99.

(b) The signs shall be of sufficient size and so located as to be easily read at any time from an approaching vessel.

(c) If advance notice is required to open the draw, the signs shall also state the name, address, and telephone number of the person to be notified.

§117.57 Advance notice.

Owners and tenders of drawbridges requiring advance notice to open shall use all reasonable means to open the draw at the requested time and give due regard to the possibility that a brief delay may be experienced by the vessel giving the advance notice.

§117.59 Special requirements due to hazards.

For the duration of occurrences hazardous to safety or navigation, such as floods, freshets, and damage to the bridge or fender system, the District Commander may require the owner of an operational drawbridge listed in this subpart to have the bridge attended full time and open on signal.

ILLINOIS

§117.389 Calumet River.

The draws of the Conrail bridges, miles 1.4 and 1.5 at Chicago, operate as follows:

(a) The draws shall open on signal; except that, if either one of the bridges is inoperable because of equipment breakdown, the other bridge need not be opened.

(b) In addition to the signals prescribed in §117.15, the following special visual signals shall be used on the bridges:

(1) When the draw cannot be opened immediately, or is open and must be closed promptly, two red lights are flashed alternately.

(2) When the draw can be opened immediately, two amber lights are flashed alternately.

(3) When the draw is open for passage, two green lights are flashed alternately.

§117.391 Chicago River.

(a) The draws of the bridges across the Chicago River from its mouth to the junction of the North and South Branches, across the South Branch from the junction to and including the West Roosevelt Road, and across the North Branch to and including North Kinzie Street and the Ohio Street bridge shall open on signal from April 1 through December 31; except that, from Monday through Friday from 7:30 a.m. to 10 a.m. and 4 p.m. to 6:30 p.m., the draws need not be opened for the passage of vessels.

(b) The draws of the bridge across the North Branch of the Chicago River at Grand Avenue, the bridges across the North Branch of the Chicago River north of the Ohio Street bridge to and including North Halsted Street and the bridges across the South Branch of the Chicago River above South Halsted Street to and including West Roosevelt Road shall open on signal from April 1 through December 31; except that, from Monday through Friday from 7 a.m. to 8 a.m. and 5:30 p.m. to 6:30 p.m., the draws need not be opened for the passage of vessels.

(c) The draws of the bridges across the North Branch of the Chicago River north of North Halsted Street and the South Branch of the Chicago River south of South Halsted Street shall open on signal from April 1 through December 31; except that, from 7 a.m. to 8 a.m. and 5:30 p.m. to 6:30 p.m., the draws need not be opened for the passage of vessels.

(d) From January 1 through March 31, the draws of the highway bridges across the Chicago River, the North Branch of the Chicago River, North Branch Canal, and the South Branch of the Chicago River shall open on signal if at least 12 hours notice is given.

(e) The Randolph Street, Cermak Road, Throop Street, and Loomis Street bridges across the South Branch of the Chicago River, the North Halsted Street bridge across the North Branch Canal, and the West Kinzie Street bridge across the North Branch of the Chicago River shall open on signal from April through December 31.

(f) The draw of the Chicago, Milwaukee, St. Paul and Pacific railroad bridge across the North Branch Canal need not be opened for the passage of vessels.

(g) Draws the following bridges in Chicago shall open on signal if tended or within 30 minutes after notice is given to the Port Director's Office:

(1) Chicago River, South Branch.
Washington Street.
Madison Street.
Monroe Street.
Adams Street.
Jackson Boulevard.
Van Buren Street.
Congress Street (Eisenhower Expressway).
Harrison Street.
Roosevelt Road.
Eighteenth Street.
Canal Street.
South Halsted Street.
(2) West Fork of the South Branch.
South Ashland Avenue.
South Damen Avenue.
(3) Chicago River, North Branch.
Grand Avenue.
Chicago Avenue.
North Halsted Street.
Ogden Avenue.
Division Street.
(4) North Branch Canal.
Ogden Avenue.
Division Street.

(h) The draws of bridges across the North Branch Canal that have a vertical clearance of less than 17 feet above Low Water Datum for Lake Michigan shall open at any time to permit the passage of tugs and tugboats.

(i) The draws of any of the bridges listed in this section shall open as soon as possible for the passage of emergency vessels of the City of Chicago or public vessels of the United States.

(j) The draw of the Lake Shore Drive bridge across Ogden Slip need not be opened for the passage of vessels.

(k) The draws of the North Avenue, Cortland Street, Webster Avenue, North Ashland Avenue, Chicago and Northwestern railroad, North Damen Avenue, and Belmont Avenue bridges across the North Branch of the Chicago River need not be opened for the passage of vessels.

(l) The opening signal for all Chicago River bridges is three short blasts or by shouting; except that, four short blasts is the opening signal for the Chicago and Northwestern railroad bridge near West Kinzie Street and the Milwaukee Road bridge near West North Avenue and five short blasts is the opening signal for the Lake Shore bridge when approaching from the north.

§117.393 Illinois River.

The draw of the automated Burlington Northern railroad bridge, mile 88.8 at Beardstown, Illinois, operates as follows:

(a) The draw is normally maintained in the fully open position, displaying a green light to indicate that vessels may pass.

(b) When a vessel is approaching and the draw is in the open position, contact shall be established by radiotelephone with the remote operator to assure that the draw remains open until passage is complete.

(c) When a vessel is approaching and the draw is in the closed position, contact shall be established by radiotelephone with the remote operator. If the draw cannot be opened immediately, alternate flashing red lights are displayed. If the draw can be opened immediately, flashing amber lights are displayed.

(d) When a train approaches the bridge and the draw is in the open position, the operator shall activate alternate flashing red lights on top of the draw, sound four short blasts, and scan the river on radar to determine whether any vessel is approaching the bridge. The remote operator shall also broadcast that the draw is closing. If a vessel or vessels are approaching the bridge within one mile, as determined by radar scanning, response to radio broadcast, or electronic detector, the flashing red lights shall be changed to flashing amber and the operator shall keep the draw in the fully open position until the vessel or vessels have cleared the bridge. If no vessel is approaching the bridge or is beneath the draw, the draw may be lowered and locked in place.

(e) After the train has cleared the bridge, the draw shall be raised to its full height and locked in place, the red flashing lights stopped, and the draw lights changed from red to green.

§117.395. Illinois Waterway.

The draws of the McDonough Street bridge, mile 287.3, Jefferson Street bridge, mile 287.9, Cass Street bridge, mile 288.1, Jackson Street bridge, mile 288.4, and Ruby Street bridge, mile 288.7, all at Joliet, shall open on signal, except that they need not open from 7:30 a.m. to 8:30 a.m. and from 4:15 p.m. to 5:15 p.m. Monday through Saturday.

INDIANA

§117.401 Trail Creek.

The draw of the Amtrak bridge, mile 0.9 at Michigan City, shall open on signal from 6:30 a.m. to 2:30 p.m. daily except Sunday from February 16 through December 14. The draw is not manned at all other times. If passage is desired, the Chief Dispatcher, Amtrak at Chicago, shall be notified. Collect telephone calls are accepted. The dispatcher shall arrange to have the draw open within 20 minutes.

MICHIGAN

§117.625 Black River.

(a) For all drawbridges across the Black River, notice requesting the opening of a draw may be given to the dispatcher of the Port Huron Police Department. Public vessels of the United States, state or local vessels used for public safety, and vessels in distress shall be passed through each drawbridge on the river as soon as possible.

(b) The draws of the Military Street bridge, mile 0.3, and Seventh Street bridge, mile 0.5, both at Port Huron, shall open on signal; except that, from May 1 through October 31 from 9 a.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draw need be opened only on the hour and half hour and, from November 1 through November 30 and April 1 through April 30 from 4 p.m. to 8 a.m., the draw shall open if at least three hours notice is given. From December 1 through March 31, the draw shall open if at least 24 hours notice is given.

(c) The draw of the Tenth Street bridge, mile 0.9 at Port Huron, shall open on signal–

(1) From May 1 through October 31 from 8 a.m. to 11 p.m. and from 11 p.m. to 8 a.m., if at least one hours notice is given:

(2) From April 1 through April 30 and November 1 through November 30, if at least three hours notice is given; and

(3) From December 1 through March 31, if at least 24 hours notice is given.

§117.627 Cheboygan River.

The draw of the US23 bridge, mile 0.9 at Cheboygan, shall open on signal:

(a) From March 16 through May 15 and September 16 through December 14.

(b) From May 16 through September 15, from 6:12 p.m. to 7:18 a.m. Monday through Friday, from 5:12 p.m. to 11:18 a.m. on Saturdays, and all day on Sundays.

(c) From May 16 through September 15 three minutes before to three minutes after the quarter hour and the three-quarters hour, from 7:18 a.m. to 6:12 p.m. Monday through Friday and from 11:18 a.m. to 5:12 p.m., on Saturdays.

(d) From December 15 through March 15, if at least 24 hours notice is given to the Cheboygan Police Department.

(e) As soon as possible for the passage of public vessels of the United States, state or local vessels used for public safety, commercial vessels, and vessels in distress.

§117.631 Detroit River (Trenton Channel).

The draw of the Wayne County (Bridge Road) bridge, mile 5.6 at Detroit, shall open on signal; except that, from December 15 through March 15, the draw shall open on signal if at least five hours notice is given.

§117.633 Grand River.

(a) Public vessels of the United States, state or local vessels used for public safety, commercial vessels, and vessels in distress shall be passed through the draw of each bridge as soon as possible.

(b) The draw of the Grand Trunk Western railroad bridge, mile 2.8 at Grand Haven, shall open on signal; except that, from December 15 through March 15, the draw shall open on signal if at least 24 hours notice is given.

(c) The draw of the US31 bridge, mile 2.9 at Grand Haven, shall open on signal–

(1) From March 16 through May 14 and from October 15 through December 14;

(2) From May 15 through October 14, from 9:03 p.m. to 6:03 a.m.;

(3) From May 15 through October 14, from 6:03 a.m. to 9:03 p.m., from three minutes before to three minutes after the hour and half hour; and

(4) From December 15 through March 15, if at least 24 hours notice is given.

(d) The draw of the Grand Trunk Western railroad bridge, mile 0.2 across the mouth of Spring Lake, shall open on signal; except that, from December 15 through March 15, the draw shall open on signal if at least 24 hours notice is given.

§117.635 Keweenaw Waterway.

The draw of the US41 bridge, mile 16.0 between Houghton and Hancock, shall open on signal; except that, from January 1 through March 15, the draws shall open on signal if at least 24 hours notice is given.

§117.637 Manistee River.

The draws of the Maple Street bridge, mile 1.1, the US31 (Smith Street) bridge, mile 1.4, and the Chessie System railroad bridge, mile 1.5, all at Manistee, shall open on signal; except that, from January 1 through March 31, the draws shall open on signal if at least 24 hours notice is given.

§117.639 Ontonagon River.

The draw of the S64 bridge, mile 0.2 at Ontonagon, shall open on signal from April 1 through November 15 from 7 a.m. to 11 p.m. and from 11 p.m. to 7 a.m., if at least one hour notice is given. From November 16 through March 31, the draw shall open on signal if at least 24 hours notice is given.

§117.641 Pine River (Charlevoix).

The draw of the US31 bridge, mile 0.3 at Charlevoix, shall be operated as follows:

(a) The draw shall open on signal; except that, from 6 a.m. to 6 p.m., the draw shall open on signal from three minutes before to three minutes after the hour and half hour. Public vessels of the United States, state or local vessels used for public safety, and vessels in distress shall be passed through the draw of each bridge as soon as possible.

(b) The owners of the bridge shall provide and keep in good legible condition two board gages painted white with black figures not less than six inches high to indicate the vertical clearance under the closed draw at all stages of the tide. The gages shall be placed on the bridge so that they are plainly visible to operators of vessels approaching the bridge either up or downstream.

§117.643 Pine River (St. Clair).

The draw of the S29 bridge, mile 0.1 at St. Clair, shall open on signal from April 1 through November 30 from 2 a.m. to 8 a.m. and from 8 a.m. to 2 a.m. on the hour and one-half hour. From December 1 through March 31, the draw shall open on signal if at least 24 hours notice is given. Public vessels of the United States, state or local vessels used for public safety, and vessels in distress shall be passed through the draw as soon as possible.

§117.645 River Rouge (Short Cut Canal).

The draws of the Jefferson Avenue bridge, mile 1.1, and the Fort Street bridge, mile 2.2, both at Detroit, shall open on signal from December 16 through March 14 and on Saturdays, Sundays, and Federal holidays from March 15 through December 15. On Monday through Friday from March 15 through December 15, the draws shall open on signal from 8:30 a.m. to 4 p.m., 4:40 p.m. to 5 p.m., and 6 p.m. to 7:30 a.m. The draws need not be opened at all other times. Public vessels of the United States, state or local vessels used for public safety, and vessels in distress shall be passed through each draw as soon as possible.

§117.647 Saginaw River.

(a) The draws of the Detroit and Mackinac railroad bridge, mile 2.5 at Bay City, the Conrail railroad bridge, mile 4.4 at Bay City, and the Chessie System railroad bridge, mile 18.0 at Saginaw, shall open on signal; except that, from December 16 through March 15, the draws shall open on signal if at least 12 hours notice is given.

(b) The draws of the Belinda Street (Independence) bridge, mile 3.3, Veterans Memorial Bridge, mile 5.0 and Lafayette Street bridge, mile 6.2, all in Bay City, shall open on signal from March 16 through December 15, except as follows:

(1) From 6:30 a.m. to 8:30 a.m. and 3:30 p.m. to 5:30 p.m., except Saturdays, Sundays, and holidays observed in the locality, the draws need not be opened for the passage of vessels of less than 50 gross tons.

(2) From 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. except on Sundays and Federal holidays, the draws need not be opened for the passage of downbound vessels of over 50 gross tons.

(3) From 8 a.m. to 8 p.m. on Saturdays, Sundays, and Federal holidays, the draws of the Belinda Street and Lafayette Street bridges need not be opened for the passage of pleasure craft except from three minutes before to three minutes after the hour and half hour.

(4) From 8 a.m. to 8 p.m. on Saturdays, Sundays, and Federal holidays, the draws of the Veterans Memorial bridge need not be opened for the passage of pleasure craft, except from three minutes before to three minutes after the quarter hour and three quarter hour.

(5) From December 16 through March 15, the draws of these bridges shall open on signal if at least 12 hours notice is given.

(c) The draw of the I-75 bridge, mile 14.5 at Zilwaukee, shall open on signal; except that, from December 16 through March 15, the draw shall open on signal if at least 12 hours notice is given.

(d) The draw of the Sixth Avenue bridge, mile 17.1 at Saginaw, shall open on signal from April 1 through November 15 from 7 a.m. to 11 p.m. At all other times, the draw shall open on signal if at least three hours notice is given.

(e) The draw of the Chessie System railroad bridge, mile 18.0, shall open on signal if at least three hours notice is given. Public vessels of the United States, state or local vessels used for public safety, and vessels in distress shall be passed as soon as possible.

(f) The draw of the Grand Trunk Western railroad bridge, mile 19.2, need not be opened for the passage of vessels.

§117.651 St. Joseph River.

The draws of the US33 (Blossomland) bridge, mile 0.9, and the BL-94 (Bicentennial) bridge, mile 1.3, both at St. Joseph, shall be operated as follows:

(a) From March 1 through May 14, from October 1 through December 15, and from 8 p.m. to 7 a.m. from May 15 through September 30, the draws shall open on signal.

(b) From 7 a.m. to 8 p.m. from May 15 through September 30, the draw of the Blossomland bridge need be opened only from three minutes before to three minutes after the hour and half hour, and the draw of the Bicentennial bridge need be opened only from three minutes before to three minutes after the quarter and three-quarter hour.

(c) From December 16 through the last day of February, the draw of both bridges shall open on signal if at least 12 hours notice is given.

(d) Public vessels of the United States, state and local government vessels used for public safety, commercial vessels, and vessels in distress shall be passed through the draw of both bridges as soon as possible.

§117.653 St. Marys Falls Canal.

The draw of the International Railway bridge, mile 1.0 at Sault Ste. Marie, shall be maintained in the fully open position during the navigation season, except for the crossings of trains or for maintenance. Bridge operators shall not give precedence to railway traffic and shall not close the bridge against an upbound vessel after lock gates are open and the vessel is proceeding toward the bridge, nor against a downbound vessel, 1,200 feet or less west of the bridge, unless the vessel is moored at either canal pier awaiting its turn to take position at lock approaches.

§117.655 Thunder Bay River.

The draw of the Second Avenue bridge, mile 0.3 at Alpena, shall open on signal if at least three hours notice is given to the Dispatcher, Police Department, City of Alpena, Michigan.

MINNESOTA

§117.661 Duluth Ship Canal (Duluth-Superior Harbor).

The draw of the Duluth Ship Canal bridge, mile 0.1 at Duluth, shall open on signal; except that, from January 1 through March 15, the draw shall open on signal if at least 24 hours notice is given. The opening signal is one prolonged blast, one short blast, one prolonged blast, one short blast. If the Duluth Ship Canal Bridge is disabled, the bridge authorities shall give incoming and outgoing vessels timely and dependable notice, by tug service if necessary, so that the vessels do not attempt to enter the canal. Vessels shall be given precedence over highway or railway traffic at all times.

§117.669 St. Louis River (Duluth Superior Harbor).

(a) The draws of the Burlington Northern railroad bridge, mile 5.7, shall open on signal; except that, from January 1 through March 15, the draws shall open on signal if at least 24 hours notice is given. The opening signal for the Minnesota draw is one prolonged blast followed by two short blasts and for the Wisconsin draw is two prolonged blasts followed by two short blasts.

(b) The draws of the Grassy Point bridge, mile 8.0, and the Arrow Head bridge, mile 8.7, shall open on signal; except that, from January 1 through March 15, the draw shall open on signal if at least 24 hours notice is given. The opening signal for the Grassy Point bridge is two prolonged blasts followed by one short blast and for the Arrowhead bridge is three prolonged blasts.

(c) The draw of the Duluth Missabe and Iron Range Railway bridge, mile 16.3, need not be opened for the passage of vessels. The owner shall return the draw to operable condition within a reasonable time when notified by the District Commander to do so.

NEW YORK

§117.773 Buffalo River.

(a) The draws of the Michigan Avenue bridge, mile 1.3, and the Ohio Street bridge, mile 2.1, both at Buffalo, shall open on signal; except that, from 7:30 a.m. to 9 p.m. and from 4 p.m. to 5:45 p.m. Monday through Saturday except New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day or other days observed instead of any of these under state law, the draws need not be opened for the passage of vessels.

(b) The draws of the South Park Avenue bridge, mile 5.3 at Buffalo, shall open on signal; except that, from 7 a.m. to 8:30 a.m. and from 4:30 p.m. to 6 p.m. Monday through Saturday except New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day or other days observed instead of these under state law, the draws need not be opened for the passage of vessels.

(c) The draws of the Conrail bridges, mile 4.02 and 4.39, both at Buffalo, shall open on signal between the hours of 11 p.m. and 7 a.m. if at least a four hour advance notice is given. However, the draw shall open within thirty minutes for vessels responding to an emergency.

§117.785 Genessee River.

(a) The following applies to all bridges listed in this section:

(1) At all times, public vessels of the United States, vessels in distress, and vessels seeking shelter from rough weather shall be passed through the bridges as soon as possible.

(2) Clearance gages of a type approved by the Commander, Ninth Coast Guard District, shall be installed on the upstream and downstream sides of each drawbridge by and at the expense of the owner of or agency controlling the bridge and the gages shall be kept in good repair and legible condition.

(b) The draw of the Conrail bridge, mile 0.9 at Rochester, shall open on signal; except that, from December 15 through March 31, the draw shall open on signal if at least 12 hours notice is given.

(c) The draw of the Stutson Street bridge, mile 1.2 at Rochester, shall open on signal from April 1 through December 15; however, from 7 a.m. to 9 a.m. and from 4 p.m. to 6 p.m. Monday through Friday except Federal holidays, the draw need be opened only for the passage of commercial vessels. From 9 a.m. to 4 p.m. and 6 p.m. to 11 p.m. Monday through Friday except Federal holidays, and from 7 a.m. to 11 p.m. on Saturdays, Sundays, and Federal holidays, the draw need be opened only on the hour and half hour, except that commercial vessels shall be passed at any time. From December 16 through March 31, the draw shall open on signal if at least 12 hours notice is given.

§117.791 Hudson River.

(a) The draws of the bridges listed in this section shall open as soon as possible at any time for the passage of the following vessels:

(1) Downbound vessels during a freshet of a height exceeding an elevation determined by the District Commander.

(2) Public vessels of the United States.

(3) State or local vessels used for public safety.

(4) Vessels of 500 tons or more.

(5) Tugs with a tow on a hawser.

(b) The draws of the bridges listed in this section shall not remain open for more than 15 minutes and may remain closed for up to 10 minutes to allow accumulated land traffic to pass.

(c) The draw of the Conrail bridge, mile 146.2 between Albany and Rensselaer, shall open on signal; except that, from December 16 through March 31, the draw shall open on signal if at least 24 hours notice is given.

(d) The draw of the state highway bridge, mile 150.2 between Troy and Menands, need not be opened for the passage of vessels.

(e) The draw of the highway bridge, mile 152.7 between Troy and Green Island, operates as follows:

(1) From April 1 through December 15, the draw shall open on signal from 9 a.m. to 4 p.m.; except that, the draw need not be opened from 6 p.m. to 7 a.m., unless notice is given before 4:30 p.m. to the time the vessel is expected to pass, and need not open from 7 a.m. to 9 a.m. and 4 p.m. to 6 p.m.

(2) From December 16 through March 31, the draw need not be opened.

(f) The draws of the 112th Street bridge, mile 155.4 between Troy and Cohoes operate as follows:

(1) The draws shall open on signal from 9 a.m. to 4 p.m.

(2) The draws shall open on signal from 6 p.m. to 7 a.m., if notice is given, before 4:30 p.m., of the time the vessel is expected to pass.

(3) The draws need not be opened from 7 a.m. to 9 a.m. and 4 p.m. to 6 p.m.

(4) During the period that the Federal lock at Troy is inoperative, the draws need not be opened for the passage of vessels, provided that emergency opening be made as soon as possible.

§117.797 Lake Champlain.

(a) The draw of each bridge listed in this section shall open as soon as possible for public vessels of the United States and vessels of the Vermont Fish and Game Department.

(b) The draw of the US2 bridge, mile 91.8 between Sandy Island and North Hero Island, shall open on signal–

(1) From May 15 through October 15 from 7 a.m. to 9 p.m.

(2) From May 15 through October 15 from 9 p.m. to 7 a.m. if at least four hours notice is given; and

(3) From October 16 through May 14 if at least 24 hours notice is given.

(c) The draw of the Central Vermont Railway bridge across Missisquoi Bay, mile 105.6 shall open on signal:

(1) From June 15 through September 15;

(i) Monday through Friday from 9 a.m. to 5 p.m.;

(ii) Saturdays, Sundays, Independence Day and Labor Day from 7 a.m. to 11 p.m.;

(iii) At all other times, if at least two hours notice is given.

(2) From September 16 through June 14, if at least 24 hours notice is given.

(d) The draw of the SR78 bridge, mile 105.9 across the entrance to Missisquoi Bay between Alburg Tongue and Hog Island at East Alburg, shall open on signal if at least 24 hours notice is given.

§117.803 Niagara River.

The draw of the Canadian National Railway bridge, mile 33.0 at Buffalo, need not be opened for the passage of vessels.

§117.809 Tonawanda Creek.

The draw of the Penn Central Corporation railroad bridge, mile 0.1 at Tonawanda, is permanently maintained in the open position.

§117.811 Tonawanda Harbor.

The draw of the Tonawanda Island Railroad bridge, mile 0.2 between North Tonawanda and Tonawanda Island, shall open on signal if at least 24 hours notice is given.

OHIO

§117.847 Ashtabula River.

(a) The draw of the Fifth Street bridge, mile 1.4 at Ashtabula, shall open on signal for the passage of commercial and emergency vessels and on the hour and half hour for all other vessels.

(b) The draw of the Conrail bridge, mile 2.2 at Ashtabula, shall open on signal from April 1 through November 30 from 7 a.m. to 11 p.m. At all other times the draw shall open on signal if at least 24 hours notice is given.

117.851 Portage River.

(a) Public vessels of the United States, State or local vessels used for public safety, commercial vessels, and vessels in distress or seeking shelter from rough weather shall be passed through the bridges listed in this section as soon as possible.

(b) The owners of the bridges listed in this section shall provide and keep in good legible condition two board gages painted white with black figures to indicate the vertical clearance under the closed draw at all stages of the tide. The gages shall be so placed on the bridge that they are plainly visible to operators of vessels approaching the bridge either up or downstream.

(c) The draws of the Monroe Street bridge, mile 0.4 at Port Clinton, shall open as follows:

(1) From May 1 through May 14 and from November 1 through December 1, the draw shall open on signal.

(2) From May 15 through October 31 from 12 midnight to 6 a.m., the draw shall open on signal; except that, from 6 a.m. to 12 midnight, the draw shall open on signal only from three minutes before to three minutes after the hour and half hour.

(3) From December 2 through April 30, the draw shall open on signal if at least 24 hours notice is given.

(d) The draws of the Conrail bridge, mile 1.5 at Port Clinton, shall open on signal; except that, from

December 2 through April 30, the draw shall open on signal if at least 24 hours notice is given.

§117.853 Sandusky Bay.

(a) The draw of the Conrail bridge, mile 3.5 at Sandusky, shall open on signal from April 1 through October 31 and from November 1 through November 30 from 8 a.m. to 4 p.m. At all other times, the draw shall open on signal if at least 24 hours notice is given to the Chief Dispatcher, Central Union Terminal, Toledo.

(b) The draw of the Ohio Highway 269 bridge, mile 8.2 at Sandusky, shall open on signal; except that, from 11 p.m. to 7 a.m., the draw shall open on signal if at least two hours notice is given to the State Highway Patrol at Sandusky.

VERMONT

§117.993 Lake Champlain.

(a) The draws of the bridges listed in this section shall open as soon as possible for the passage of public vessels of the United States and Vermont Fish and Game Department vessels.

(b) The draw of the US2 bridge, mile 91.8 between South Hero Island and North Hero Island, shall open on signal–

(1) From May 15 through October 15 from 7 a.m. to 9 p.m.;

(2) From May 15 through October 15 from 9 p.m. to 7 a.m. if at least four hours notice is given; and

(3) From October 16 through May 14 if at least 24 hours notice is given.

(c) The draw of the Central Vermont Railway bridge across Missisquoi Bay, mile 105.6 shall open on signal:

(1) From June 15 through September 15;

(i) Monday through Friday from 9 a.m. to 5 p.m.;

(ii) Saturdays, Sundays, Independence Day and Labor Day from 7 a.m. to 11 p.m.;

(iii) At all other times, if at least two hours notice is given.

(2) From September 16 through June 14, if at least 24 hours notice is given.

(d) The draw of the SR78 bridge, mile 105.9 between Alburg Tongue and East Alburg, shall open on signal if at least 24 hours notice is given.

WISCONSIN

§117.1083 Duluth-Superior Harbor (St. Louis River).

(a) The draws of the Burlington Northern railroad bridge, mile 5.7 at Duluth, shall open on signal; except that, from January 1 through March 15, the draws shall open on signal if at least 24 hours notice is given. The opening signal for the Minnesota draw is one prolonged blast followed by two short blasts and for the Wisconsin draw is two prolonged blasts followed by two short blasts.

(b) The draws of the Grassy Point bridge, mile 8.0 at Duluth, and the Arrowhead bridge, mile 8.7 at Duluth, shall open on signal; except that, from January 1 through March 15, the draws shall open on signal if at least 24 hours notice is given. The opening signal for the Grassy Point bridge is two short blasts followed by one prolonged blast and for the Arrowhead bridge is three prolonged blasts.

(c) The draw of the Duluth, Missabe and Iron Range Railway bridge, mile 16.3 at Duluth, need not be opened for the passage of vessels. The owner shall return the draw to operable condition within a reasonable time when notified by the District Commander to do so.

§117.1085 East River.

The draw of the Monroe Avenue bridge, mile 0.3 at Green Bay, need not be opened for the passage of vessels.

§117.1087 Fox River.

(a) The draws of the Main Street bridge, mile 1.6, Walnut Street bridge, mile 1.8, and Mason Street bridge, mile 2.2, all at Green Bay, need not be opened for the passage of vessels from 7 a.m. to 8 a.m., 12 noon to 1 p.m., and 4 p.m. to 5 p.m. Monday through Saturday except Federal holidays. Public vessels of the United States, tugs, fireboats, and vessels with a cargo capacity of 300 short tons or over engaged in commercial transportation shall be passed at any time. The opening signal for the Main Street bridge is two short blasts followed by one prolonged blast, for the Walnut Street bridge one prolonged blast followed by two short blasts, and for the Mason Street bridge one prolonged blast, followed by one short blast, followed by one prolonged blast.

(b) The draw of the George Street bridge, mile 7.2 at DePere, shall open on signal during the navigation season; except that, from 6 p.m. to 8 a.m. during the navigation season, the draw shall open on signal if at least two hours notice is given.

(c) The draws of the Main Street bridge, mile 56.3, Jackson Street bridge, mile 56.5, Wisconsin Street bridge, mile 57.0, and the Congress Avenue bridge, mile 58.3 all at Oshkosh, shall open on signal from 8 a.m. to 12 midnight; except that, from Monday through Friday from 11:45 a.m. to 12:15 p.m., 12:45 p.m. to 1:15 p.m., and 3 p.m. to 5 p.m., the draws need not be opened for other than public vessels of the United States except on Memorial Day, Independence Day, and Labor Day. From 12 midnight to 8 a.m., the draws shall open on signal if at least two hours notice is given by radiotelephone to the Main Street bridge drawtender or the Winnebago County Sheriff's Department.

(d) The draw of each bridge at or between Berlin and Portage need not open for the passage of vessels.

§117.1089 Manitowoc River.

(a) The draws of the Eighth Street bridge, mile 0.3, and the Tenth Street bridge, mile 0.5, both at Manitowoc, shall open on signal Monday through Friday except Saturdays, Sundays, New Year's Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day or on the Monday following these holidays when they occur on a Sunday. The draws need not be opened from 6:50 a.m. to 7 a.m., 7:50 a.m. to 8 a.m., 11:55 a.m. to 12:10 p.m., and 12:45 p.m. to 1 p.m. The opening signal for the Eighth Street bridge is one prolonged blast followed by one short blast and for the Tenth Street bridge is two short blasts followed by one prolonged blast. When signal is given by a car ferry or other large vessel to open either bridge, the remaining bridge shall also be opened promptly so that the vessel is not held between the two bridges.

(b) The draw of the Soo Line railroad bridge, mile 0.9 shall open on the signal of two short blasts followed by one prolonged blast.

§117.1091 Menominee River.

The draw of the Ogden-First Street bridge, mile 0.4 at Marinette, shall open on signal from 7 a.m. to 11 p.m. from May 1 through October 31. From 11 p.m. to 7 a.m. from May 1 through October 31, the draw shall open on signal if at least two hours notice is given. From November 1 through April 30, the draw shall open on signal if at least 12 hours notice is given.

§117.1093 Milwaukee, Menomonee, and Kinnickinnic Rivers and South Menomonee and Burnham Canals.

(a) The draws of each bridge listed in this section shall open as soon as possible for the passage of public vessels of the United States, vessels carrying United States mail, vessels licensed to carry 50 or more passengers when on their regular routes, and fireboats of the City of Milwaukee.

(b) For all bridges, the drawtender's acknowledging signal when the draw will open is the same as the opening signal. The acknowledging signal when the draw will not open, or is open and must be closed promptly is four short blasts.

(c) The draws of bridges across the Milwaukee River operate as follows:

(1) The draws of the North Broadway Street bridge, mile 0.5, North Water Street bridge, mile 0.6, and Michigan Street bridge, mile 1.1, all at Milwaukee, shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened.

(2) The draws of all other bridges across the Milwaukee River shall open on signal if at least two hours notice is given; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m., the draws need not be opened.

(3) The opening signals are as follows:

(i) The Chicago and Northwestern bridge, mile 0.3, two prolonged blasts.

(ii) The North Broadway Street bridge, mile 0.5, three prolonged blasts followed by one short blast.

(iii) The North Water Street bridge, mile 0.6, three prolonged blasts followed by two short blasts.

(d) The draws of bridges across the Menomonee River and South Menomonee Canal operate as follows:

(1) The draw of the North Plankinton Avenue bridge across the Menomonee River, mile 0.1, shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened.

(2) The draws of all other bridges across the Menomonee River and South Menomonee Canal shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened and, from 11 p.m. to 7 a.m., the draws shall open on signal if at least two hours notice is given.

(3) The opening signal for the Chicago, Milwaukee, St. Paul and Pacific railroad bridge across the Menomonee River, mile 0.1, is two prolonged blasts followed by two short blasts.

(e) The draws of bridges across the Kinnickinnic River operate as follows:

(1) The draw of the Kinnickinnic Avenue bridge, mile 1.5, shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draw need not be opened.

(2) The draws of the Chicago, Milwaukee, St. Paul and Pacific railroad bridge, mile 1.5, and the Chicago and Northwestern Railway bridge, mile 1.52, shall open on signal if at least two hours notice is given.

(3) The draws of all other bridges across the Kinnickinnic River shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened and, from 11 p.m. to 7 a.m., the draws shall open on signal if at least two hours notice is given.

(4) The opening signal for the Chicago and Northwestern bridge, mile 1.0, is two prolonged blasts.

(f) The draws of bridges across the Burnham Canal operate as follows:

(1) The draw of the Chicago, Milwaukee, St. Paul and Pacific railroad bridge, mile 0.8, shall open on signal if at least two hours notice is given.

(2) The draws of all other bridges across the Burnham Canal shall open on signal; except that, from 7:30 a.m. to 8:30 a.m. and 4:30 p.m. to 5:30 p.m. Monday through Saturday except Federal holidays, the draws need not be opened and, from 11 p.m. to 7 a.m., the draws shall open on signal if at least two hours notice is given.

§117.1095 Root River.

(a) The draw of the Main Street bridge, mile 0.3 shall open on signal; except that, from April 1 through December 1 from 6 a.m. to 6 p.m., the draw need be opened only on the hour, 20 minutes after the hour, and 40 minutes after the hour to pass all accumulated vessels; and, from December 2 through March 31, the draw shall open on signal if at least two hours notice is given. At all times, public vessels of the United States, state or local vessels used for public safety, commercial vessels, and vessels in distress shall be passed as soon as possible.

(b) The draw of the State Street bridge, mile 0.5, shall open on signal; except that, from October 16 through April 30, the draw shall open on signal if at least two hours notice is given. At all times, public vessels of the United States, state or local vessels used for public safety, commercial vessels, and vessels in distress shall be passed as soon as possible.

§117.1097 Sheboygan River.

The draw of the Eighth Street bridge, mile 0.7 at

Sheboygan, shall open on signal from May 1 through October 31 from 6 a.m. to 10 p.m. including Sundays and legal holidays; except that, from 6:10 a.m. to 7:10 p.m. Monday through Saturday, the draw need be opened only at 10 minutes after the hour, on the half hour, and at 10 minutes before the hour. At all other times, the draw shall open on signal if at least two hours notice is given. At all times, public vessels of the United States, state or local vessels used for public safety, and vessels seeking shelter from rough weather shall be passed as soon as possible.

§117.1101 Sturgeon Bay.

The draw of the highway bridge, mile 4.3 at Sturgeon Bay, shall open as follows:

(a) From March 15 through May 14 and from September 15 through December 31, the draws shall open on signal.

(b) From May 15 through September 15, the draw shall open on signal from 6 p.m. to 6:30 a.m.

(c) From May 15 through September 15 from 6:30 a.m. to 6 p.m., the draw shall open on the hour and half hour, provided vessels are waiting to pass. However, public vessels of the United States and commercial vessels shall be passed through the draw without delay during this period.

(d) From January 1 through March 14, the draw shall open on signal if at least 12 hours notice is given.

§117.1107 Wolf River.

The draw of the Winneconne highway bridge, mile 2.4 at Winneconne, shall open on signal; except that, from 11 p.m. to 7 a.m. from May 1 through October 31, at least two hours notice is required and, from November 1 through April 30, at least 12 hours notice is required. At all times, public vessels of the United States, state and local vessels used for public safety, and vessels in distress shall be passed as soon as possible.

Note.–Call signs and radio channels for drawbridges equipped with radiotelephones are included with the bridge descriptions in chapters 4 through 14.

Part 160–Ports and Waterways Safety-General

Subpart A–General

§160.1 Purpose.

(a) Part 160 contains regulations implementing the Ports and Waterways Safety Act (33 U.S.C. 1221) and related statutes.

§160.3 Definitions.

(a) For the purposes of this part:

(1) "Commandant" means the Commandant of the United States Coast Guard.

(2) "District Commander" means the officer of the Coast Guard designated by the Commandant to command a Coast Guard District described in 33 CFR 3.

(3) "Captain of the Port" means the Coast Guard officer commanding a Captain of the Port zone described in 33 CFR 3.

(4) "Person" means an individual, firm, corporation, association, partnership, or governmental entity.

(5) "State" means each of the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Trust Territories of the Pacific Islands, the Commonwealth of the Northern Marianas Islands, and any other commonwealth, territory, or possession of the United States.

(6) "Vessel" means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water.

(7) "Vehicle" means every type of conveyance capable of being used as a means of transportation on land.

§160.5 Delegations.

(a) District Commanders and Captains of the Ports are delegated the authority to establish safety zones.

(b) Under the provisions of 33 CFR 6.04-1 and 6.04-6, District Commanders and Captains of the Ports have been delegated authority to establish security zones.

(c) Under the provisions 33 CFR §1.05-1, District Commanders have been delegated authority to establish regulated navigation areas.

(d) Under the direction of the Captain of the Port Honolulu, the Commander, Marianas Section, may exercise the authority of a Captain of the Port within the waters surrounding Guam, and the Commonwealth of Marianas, all of which are in the Honolulu Captain of the Port Zone.

§160.7 Appeals.

(a) Any person directly affected by a safety zone or an order or direction issued under this subchapter (33 CFR Subchapter P) may request reconsideration by the official who issued it or in whose name it was issued. This request may be made orally or in writing, and the decision of the official receiving the request may be rendered orally or in writing.

(b) Any person directly affected by the establishment of a safety zone or by an order or direction issued by, or on behalf of, a Captain of the Port may appeal to the District Commander through the Captain of the Port. The appeal must be in writing, except as allowed under paragraph (d) of this section, and shall contain complete supporting documentation and evidence which the appellant wishes to have considered. Upon receipt of the appeal, the District Commander may direct a representative to gather and submit documentation or other evidence which would be necessary or helpful to a resolution of the appeal. A copy of this documentation and evidence is made available to the appellant. The appellant is afforded five working days from the date of receipt to submit rebuttal materials. Following submission of all materials, the District Commander issues a ruling, in writing, on the appeal. Prior to issuing the ruling, the District Commander may, as a matter of discretion, allow oral presentation on the issues.

(c) Any person directly affected by the establishment of a safety zone or by an order or direction issued by a District Commander, or who receives an unfavorable ruling on an appeal taken under paragraph (b) of this section, may appeal through the District Commander to the Chief, Office of Marine Environment and Systems, U.S. Coast Guard, Washington, D.C. 20593. The appeal must be in writing, except as allowed under paragraph (d) of this section. The District Commander forwards the appeal, all the documents and evidence which formed the record upon which the order or direction was issued or the ruling under paragraph (b) of this section was made, and any comments which might be relevant, to the Chief, Office of Marine Environment and Systems. A copy of this documentation and evidence is made available to the appellant. The appellant is afforded five working days from the date of receipt to submit rebuttal materials to the Chief, Office of Marine Environment and Systems. The decision of the Chief, Office of Marine Environment and Systems is based upon the materials submitted, without oral argument or presentation. The decision of the Chief, Office of Marine Environment and Systems is issued in writing and constitutes final agency action.

(d) If the delay in presenting a written appeal would have significant adverse impact on the appellant, the appeal under paragraphs (b) and (c) of this section may initially be presented orally. If an initial presentation of the appeal is made orally, the appellant must submit the appeal in writing within five days of the oral presentation to the Coast Guard official to whom the presentation was made. The written appeal must contain, at a minimum, the basis for the appeal and a summary of the material presented orally. If requested, the official to whom the appeal is directed may stay the effect of the action while the ruling is being appealed.

Subpart B–Control of Vessel and Facility Operations

§160.101 Purpose.

This subpart describes the authority exercised by District Commanders and Captains of the Ports to insure the safety of vessels and waterfront facilities, and the protection of the navigable waters and the resources therein. The controls described in this subpart are directed to specific situations and hazards.

§160.103 Applicability.

(a) This subpart applies to any–

(1) Vessel on the navigable waters of the United States, except as provided in paragraphs (b) and (c) of this section;

(2) Bridge or other structure on or in the navigable waters of the United States; and

(3) Land structure or shore area immediately adjacent to the navigable waters of the United States.

(b) This subpart does not apply to any vessel on the Saint Lawrence Seaway.

(c) Except pursuant to international treaty, convention, or agreement, to which the United States is a party, this subpart does not apply to any foreign vessel that is not destined for, or departing from, a port or place subject to the jurisdiction of the United States and that is in–

(1) Innocent passage through the territorial sea of the United States;

(2) Transit through the navigable waters of the United States which form a part of an international strait.

§160.105 Compliance with orders.

Each person who has notice of the terms of an order issued under this subpart must comply with that order.

§160.107 Denial of entry.

Each District Commander or Captain of the Port, subject to recognized principles of international law, may deny entry into the navigable waters of the United States or to any port or place under the jurisdiction of the United States, and within the district or zone of that District Commander or Captain of the Port, to any vessel not in compliance with the provisions of the Port and Tanker Safety Act (33 U.S.C. 1221-1232) or the regulations issued thereunder.

§160.109 Waterfront facility safety.

(a) To prevent damage to, or destruction of, any bridge or other structure on or in the the navigable waters of the United States, or any land structure or shore area immediately adjacent to those waters, and to protect the navigable waters and the resources therein from harm resulting from vessel or structure damage, destruction, or loss, each District Commander or Captain of the Port may–

(1) Direct the handling, loading, unloading, storage, stowage, and movement (including the emergency removal, control, and disposition) of explosives or other dangerous articles and substances, including oil or hazardous material as those terms are defined in Section 4417a of the Revised Statutes, as amended, (48 U.S.C. 391a) on any structure on or in the navigable waters of the United States, or any land structure or shore area immediately adjacent to those waters; and

(2) Conduct examinations to assure compliance with the safety equipment requirements for structures.

§160.111 Special orders applying to vessel operations.

Each District Commander or Captain of the Port may order a vessel to operate or anchor in the manner directed when–

(a) The District Commander or Captain of the Port has reasonable cause to believe that the vessel is not in compliance with any regulation, law or treaty;

(b) The District Commander or Captain of the Port determines that the vessel does not satisfy the conditions for vessel operation and cargo transfers specified in §160.113; or

(c) The District Commander or Captain of the Port has determined that such order is justified in the interest of safety by reason of weather, visibility, sea conditions, temporary port congestion, other temporary hazardous circumstances, or the condition of the vessel.

§160.113 Prohibition of vessel operation and cargo transfers.

(a) Each District Commander or Captain of the Port may prohibit any vessel subject to the provisions of section 4417a of the Revised Statutes (46 U.S.C. 391a) from operating in the navigable waters of the United States, or from transferring cargo or residue in any port or place under the jurisdiction of the United States, and within the district or zone of that District Commander or Captain of the Port, if the District Commander or the Captain of the Port determines that the vessel's history of accidents, pollution incidents, or serious repair problems creates reason to believe that the vessel may be unsafe or pose a threat to the marine environment.

(b) The authority to issue orders prohibiting operation of the vessels or transfer of cargo or residue under paragraph (a) of this section also applies if the vessel:

(1) Fails to comply with any applicable regulation;

(2) Discharges oil or hazardous material in violation of any law or treaty of the United States;

(3) Does not comply with applicable vessel traffic service requirements;

(4) While underway, does not have at least one licensed deck officer on the navigation bridge who is capable of communicating in the English language.

(c) When a vessel has been prohibited from operating in the navigable waters of the United States under paragraphs (a) or (b) of this section, the District Commander or Captain of the Port may allow provisional entry into the navigable waters of the United States, or into any port or place under the jurisdiction of the United States and within the district or zone of that District Commander or Captain of the Port, if the owner or operator of such vessel proves to the satisfaction of the District Commander or Captain of the Port, that the vessel is not unsafe or does not pose a threat to the marine environment, and that such entry is necessary for the safety of the vessel or the persons on board.

(d) A vessel which has been prohibited from operating in the navigable waters of the United States, or from transferring cargo or residue in a port or place under the jurisdiction of the United States under the provisions of paragraph (a) or (b)(1), (2) or (3) of this section, may be allowed provisional entry if the owner or operator proves, to the satisfaction of the District Commander or Captain of the Port that has jurisdiction, that the vessel is no longer unsafe or a threat to the environment, and that the condition which gave rise to the prohibition no longer exists.

§160.115 Withholding of clearance.

(a) Each District Commander or Captain of the Port may request the Secretary of the Treasury, or the authorized representative thereof, to withhold or revoke the clearance required by 46 U.S.C. 91 of any vessel, the owner or operator of which is subject to any penalties under 33 U.S.C. 1232.

Subpart C–Notifications of Arrivals, Departures, Hazardous Conditions, and Certain Dangerous Cargoes

§160.201 Applicability and exceptions to applicability.

(a) This subpart prescribes notification requirements for U.S. and foreign vessels bound for or departing from ports or places in the United States.

(b) This subpart does not apply to boats under the Federal Boat Safety Act of 1971 (46 U.S.C. 1451, et seq.) and, except §161.215, does not apply to passenger and supply vessels when they are employed in the exploration for or in the exploitation of oil, gas, or mineral resources on the continental shelf.

(c) Sections 160.207 and 160.209 do not apply to the following:

(1) Each vessel of less than 1,600 gross tons.

(2) Each vessel operating exclusively within a Captain of the Port zone.

(3) Each vessel operating upon a route that is described in a schedule that is submitted to the Captain of the Port for each port or place of destination listed in the schedule at least 24 hours in advance of the first date and time of arrival listed on the schedule and contains–

(i) Name, country of registry, and call sign or official number of the vessel;

(ii) Each port or place of destination; and

(iii) Dates and times of arrivals and departures at those ports or places.

(4) Each vessel arriving at a port or place under force majeure.

(5) Each vessel entering a port of call in the United States in compliance with the Automated Mutual Assistance Vessel Rescue System (AMVER).

(6) Each vessel entering a port of call in the United States in compliance with the U.S. Flag Merchant Vessel Locator Filing System (USMER).

(7) Each barge.

(8) Each public vessel.

(9) United States or Canadian flag vessels, except tank vessels or vessels carrying certain dangerous cargo, which operate solely on the Great lakes.

(d) Sections 160.207, 160.211, and 160.213 apply to each vessel upon the waters of the Mississippi River between its mouth and mile 235, Lower Mississippi River, above Head of Passes, Sections 160.207, 160.211, and 160.213 do not apply to each vessel upon the waters of the Mississippi River between its sources and mile 235, above Head of Passes, and all the tributaries emptying thereinto and their tributaries, and that part of the Atchafalaya River above its junction with the Plaquemine-Morgan City alternate waterway, and the Red River of the North.

§160.203 Definitions.

As used in this subpart:

"Agent" means any person, partnership, firm, company or corporation engaged by the owner or charterer of a vessel to act in their behalf in matters concerning the vessel.

"Carried in bulk" means a commodity that is loaded or carried on board a vessel without containers or labels and received and handled without mark or count.

"Certain dangerous cargo" includes any of the following:

(a) Class A explosives, as defined in 46 CFR 146.20-7 and 49 CFR 173.53.

(b) Oxidizing materials or blasting agents for which a permit is required under 49 CFR 176.415.

(c) Highway route controlled quantity radioactive material, as defined in 49 CFR 173.403(l), or Fissile Class III shipments of fissile radioactive material, as defined in 49 CFR 173.455(a)(3).

(d) Each cargo under Table 1 of 46 CFR Part 153 when carried in bulk.

(e) Any of the following when carried in bulk:

Acetaldehyde
Ammonia, anhydrous
Butadiene
Butane
Butene
Butylene Oxide
Chlorine
Ethane
Ethylene
Ethylene Oxide
Methane
Methyl Acetylene, Propadiene Mixture, Stabilized
Methyl Bromide
Methyl Chloride
Phosphorous, elemental
Propane
Propylene
Sulfur Dioxide
Vinyl Chloride.

"Great Lakes" means Lakes Superior, Michigan, Huron, Erie, and Ontario, their connecting and tributary waters, the Saint Lawrence River as far east as Saint Regis, and adjacent port areas.

"Hazardous condition" means any condition that could adversely affect the safety of any vessel, bridge, structure, or shore area or the environmental quality of any port, harbor, or navigable water of the United States. This condition could include but is not limited to, fire, explosion, grounding, leakage, damage, illness of a person on board, or a manning shortage.

"Port or place of departure" means any port or place in which a vessel is anchored or moored.

"Port or place of destination" means any port or place to which a vessel is bound to anchor or moor.

"Public vessel" means a vessel owned by and being used in the public service of the United States. This definition does not include a vessel owned by the United States and engaged in a trade or commercial service or a vessel under contract or charter to the United States.

§160.205 Waivers.

The Captain of the Port may waive, within that Captain of the Port's designated zone, any of the requirements of this subpart for any vessel or class of vessels upon finding that the vessel, route, area of operations, conditions of the voyage, or other circumstances are such that application of this subpart is unnecessary or impractical for purposes of safety, environmental protection, or national security.

§160.207 Notice of arrival: vessels bound for ports or places in the United States.

(a) The owner, master, agent or person in charge of a vessel on a voyage of 24 hours or more shall report under paragraph (c) of this section at least 24 hours before entering the port or place of destination.

(b) The owner, master, agent, or person in charge of a vessel on a voyage of less than 24 hours shall report under paragraph (c) of this section before departing the port or place of departure.

(c) The Captain of the Port of the port or place of destination in the United States must be notified of–

(1) The name and country of registry of the vessel;

(2) The name of the port or place of departure;

(3) The name of the port or place of destination; and

(4) The estimated time of arrival at the port or place.

If the estimated time of arrival changes by more than six hours from the latest reported time, the Captain of the Port must be notified of the correction as soon as the change is known.

§160.209 Notice of arrival: vessels bound from the high seas for ports or places on the Great Lakes.

In addition to complying with the requirements of §160.207, the owner, master, agent, or person in charge of a vessel bound from the high seas for any port or place of destination on the Great Lakes shall notify the Commander, Ninth Coast Guard District, at least 24 hours before arriving at the Snell Locks, Massena, New York of–

(a) The name and country of registry of the vessel; and

(b) The estimated time of arrival at the Snell Locks, Massena, New York.

§160.211 Notice of arrival: vessels carrying certain dangerous cargo.

(a) The owner, master, agent or person in charge of a vessel, except a barge, bound for a port or place in the United States carrying a certain dangerous cargo shall notify the Captain of the Port of the of the port or place of destination at least 24 hours before entering that port or place of–

(1) The name and country of registry of the vessel;

(2) The location of the vessel at the time of the report;

(3) The name of each certain dangerous cargo carrier;

(4) The amount of each certain dangerous cargo carried;

(5) The stowage location of each certain dangerous cargo;

(6) The operational condition of the equipment under 33 CFR 164.35;

(7) The name of the port or place of destination; and

(8) The estimated time of arrival at that port or

place. If the estimated time of arrival changes by more than six hours from the latest reported time, the Captain of the Port must be notified of the correction as soon as the change is known.

(b) The owner, master, agent, or person in charge of a barge bound for a port or place in the United States carrying a certain dangerous cargo shall report the information required in paragraph (a)(1) through (a)(8) of this section to the Captain of the Port of the port or place of destination at least 4 hours before entering that port or place.

§160.213 Notice of departure: vessels carrying certain dangerous cargo.

(a) The owner, master, agent, or person in charge of a vessel, except a barge, departing from a port or place in the United States for any other port or place and carrying a certain dangerous cargo shall notify the Captain of the Port of the port or place of departure at least 24 hours before departing, unless this notification was made within 2 hours after the vessel's arrival of–

(1) The name and country of the registry of the vessel;

(2) The name of each certain dangerous cargo carried;

(3) The amount of each certain dangerous cargo carried;

(4) The stowage location of each certain dangerous cargo carried;

(5) The operational condition of the equipment under 33 CFR 164.35;

(6) The name of the port or place of departure; and

(7) The estimated time of departure from the port or place.

If the estimated time of departure changes by more than six hours from the latest reported time, the Captain of the Port must be notified of the correction as soon as the change is known.

(b) The owner, master, agent, or person in charge of a barge departing from a port or place in the United States for any other port or place and carrying a certain dangerous cargo shall report the information required in paragraph (a)(1) through (a)(7) of this section to the Captain of the Port of the port or place of departure at least 4 hours before departing unless this report was made within 2 hours after the barge's arrival.

§160.215 Notice of hazardous conditions.

Whenever there is a hazardous condition on board a vessel, the owner, master, agent, or person in charge shall immediately notify the Captain of the Port of the port or place of destination and the Captain of the Port of the port or place in which the vessel is located of the hazardous condition.

Part 161–Vessel Traffic Management

Subpart A–(Reserved)

Subpart B–Vessel Traffic Service

St. Marys River Vessel Traffic Service

GENERAL RULES

§161.801 Purpose and applicability.

(a) Sections 161.800-161.899 prescribe rules for vessel operation in the St. Marys River Vessel Traffic Service (VTS) Area to prevent collisions and groundings, to protect improvements to the waterways, and to protect the navigable waters of the VTS Area from environmental harm.

(b) The General Rules in §§161.800-161.811, the Anchorage Rules in §§161.860-161.870, and the Miscellaneous Rules in §§161.800-161.894 apply to all vessels.

(c) The Communications Rules in §§161.820-161.844 and the Traffic Rules in §§161.850-161.856 apply only to the following vessels:

(1) Vessels over 20 meters (65 feet) in length, except fishing vessels of under 300 gross tons.

(2) Commercial vessels over 8 meters (26 feet) in length engaged in towing another vessel astern, alongside, or by pushing ahead.

(3) Dredges and floating plants.

(d) The Speed Rules in §§161.880-161.886 apply only to vessels over 20 meters (65 feet) in length.

§161.803 Definitions.

As used in §§161.800-161.899–

"Area Engineer" means the local representative of the District Engineer who acts for that officer with respect to the St. Marys Falls Canal and the VTS Area. The Area Engineer's office is located at the locks of the St. Marys Falls Canal.

"Captain of the Port, Sault Ste. Marie, Michigan" (COTP) means the officer of the U.S. Coast Guard assigned the duty of enforcing the VTS regulations.

"District Engineer" means the officer of the U.S. Army Corps of Engineers responsible for enforcing the regulations for the St. Marys Falls Canal and Locks (33 CFR 207.440). The District Engineer's office is at Detroit, Michigan. The movements of vessels in the St. Marys Falls Canal are under the direction of the District Engineer or his local representative.

"No Passing Zone" means an area where meeting, U-turns, and overtaking are prohibited.

"Soo Control" means the shore-based facility that operates the St. Marys River VTS for the COTP.

"Vessel Traffic Service Area (VTS Area)" means the navigable waters of the United States in the St. Marys River and lower Whitefish Bay from latitude 45°57'N. (De Tour Reef Light), to the south, to latitude 46°38.7'N. (Ile Parisienne Light), to the north, except the waters of the St. Marys Falls Canal. The waters of the VTS Area are delineated, to the east, from Potagannissing Bay and Worsley Bay by a line from La Pointe to Sims Point.

§161.804 Vessel operation in the VTS Area.

No person may cause or authorize the operation of a vessel in the VTS Area contrary to the rules in §§161.800 through 161.899.

§161.805 Laws and regulations not affected.

Nothing in §§161.800 through 161.899 is intended to relieve any person from complying with–

(a) The Inland Navigational Rules (33 U.S.C. 2001 et seq.);

(b) Vessel Bridge-to-Bridge Radiotelephone Regulations (Part 26 of this chapter);

(c) The Federal Boat Safety Act of 1971 (46 U.S.C. 1451-1489) and

(d) Any other law or regulation.

§161.807 Soo Control directions.

(a) During conditions of vessel congestion, full or partial channel obstructions, severe storms, reduced visibility, heavy ice, strong currents, low water, or similar hazardous circumstances in the VTS Area, Soo Control may issue directions specifying times when vessels may enter, move within or through, or depart from ports, harbors, reaches, channels, or other waters in the VTS Area.

(b) When, by reason of ice or other special conditions, low powered vessels, vessels with one or more tows, or vessels of a particular construction cannot maintain their order of proceeding and constitute a hazard to other vessels, Soo Control may temporarily refuse the vessels permission to enter or proceed in the river.

(c) The master of a vessel in the VTS Area shall comply with directions issued to him or her under this section.

§161.809 Authority to deviate from these rules.

(a) The Commander, Ninth Coast Guard district, may, upon written request, issue an authorization to deviate from any rule in §§161.800-161.899 if that officer finds the proposed operations can be accomplished safely. Each written application for authorization must state the need for the authorization and describe how the proposed operation can be conducted safely.

(b) Soo Control may, upon verbal request, issue an authorization to deviate from any rule in this subpart, for a single voyage or part of a single voyage on which the vessel is embarked or about to embark. Authorizations by Soo Control shall not be for an extended period of time or for successive voyages.

§161.811 Emergency deviations.

In an emergency, any person may deviate from any provision in §§161.800 through 161.899 to the extent necessary to avoid endangering persons, property, or the environment.

COMMUNICATION RULES

§161.820 Radio listening watch.

The master of a vessel in the VTS Area shall continuously monitor Channel 16 (156.8 MHz) VHF-FM and be prepared to communicate with Soo Control on Channel 12 (156.6 MHz) VHF-FM.

§161.821 Frequency for reports.

Reports to Soo Control under §§161.828, 161.830, and 161.832 must be made on Channel 12 (156.6 MHz) VHF-FM.

§161.822 Radiotelephone equipment.

Each report required by §§161.800 through 161.899 to be made by radiotelephone must be made using a radiotelephone that is capable of operation on the navigational bridge of the vessel, or in the case of a dredge, at its main control station.

§161.824 English language.

Each report required by §§161.800-161.899 must be made in the English language.

§161.828 Initial report.

When a vessel enters the VTS Area at Ile Parisienne or De Tour, or at least 15 minutes, but not more than 30 minutes, before a vessel enters at some other point or gets underway within the VTS Area, the master of the vessel shall report the following information to Soo Control:

(a) Name and draft of the vessel.

(b) Location and/or estimated time of entering or getting underway.

(c) The nature of any tow, including log booms or rafts.

(d) Destination, if in the VTS Area.

§161.830 Movement reports.

Whenever a vessel passes a reporting point listed in §161.834 or promulgated in accordance with §161.836 or whenever a vessel within the VTS Area gets underway and begins to navigate, the master shall report the following to Soo Control:

(a) Name of the vessel.

(b) The reporting point or the location.

§161.832 Final report.

Whenever a vessel anchors in, moors in, or departs from the VTS Area, the master shall report the place of anchorage or mooring or the location of departure to Soo Control.

§161.834 Permanent reporting points.

The following are permanent reporting points.

Upbound vessels:

Initial report - De Tour Reef Light.

Movement reports - Munuscong Lake Junction Lighted Bell Buoy; Oak Ridge; Ninemile Point; Six Mile Point; Mission Point; leaving locks; Brush Point; Birch Point.

Final report - Ile Parisienne Light.

Downbound vessels:

Initial report - Ile Parisienne Light.

Movement reports - Birch Point; Brush Point; leaving locks; Mission Point; Six Mile Point; Ninemile Point; Oak Ridge; Munuscong Lake Junction Lighted Bell Buoy.

Final report - De Tour Reef Light.

§161.836 Seasonal or temporary reporting points.

(a) Commander, Ninth Coast Guard District, may publish additional reporting points for use during the winter navigation season. These seasonal reporting points with their effective dates are published in Local Notices to Mariners and are available from Soo Control.

(b) Captain of the Port, Sault Ste. Marie, may publish additional reporting points as temporary navigation conditions require. These temporary reporting points with their effective times are published by Broadcast Notices to Mariners and are available from Soo Control.

§161.838 Transit of Canadian waters.

Vessels which have already reported to Soo Control need not make a final report or an initial report when departing or reentering the VTS Area for a brief transit of Canadian waters.

§161.840 Radio failure.

Whenever a vessel's radiotelephone equipment fails–

(a) The master shall, if practical to do so, notify Soo Control;

(b) The master is not required to moor or anchor the vessel for this reason alone, but the master shall give due consideration to this loss of capability and navigate with extraordinary caution;

(c) Compliance with §§161.820 and 161.830 is not required; and

(d) Compliance with §§161.828, 161.829, and 161.832 is not required, unless the required reports can be made by telephone.

§161.842 Report of impairment or other hazard.

The master of any vessel in the VTS Area shall report to Soo Control as soon as possible–

(a) Any condition on the vessel that may impair its navigation, such as fire, defective propulsion machinery, or defective steering equipment;

(b) Any tow that the towing vessel is unable to control, or can control only with difficulty; and

(c) Any grounding, striking of obstruction, or striking of an aid to navigation, whether in or out of the channel.

Note.–The master of any vessel in the VTS Area is encouraged to report to Soo Control as soon as possible–

(a) Any locations where the visibility is less than one mile; and

(b) Any obstruction of a channel, grounded vessels, malfunctioning aid to navigation, or other hazardous or dangerous situation which has not been published by Notice to Mariners or Broadcast Notice to Mariners.

§161.844 Ferry vessels.

The master of any ferry vessel operating in the VTS Area which is operating in accordance with a route and schedule which has been provided to Soo Control need not comply with §§161.828 and 161.832.

TRAFFIC RULES

§161.850 One way traffic-normal conditions.

Under normal conditions, two-way traffic is permitted in all channels except the following:

(a) West Neebish Channel from Buoy 53 to Buoy 1 shall be used only by vessels proceeding in a downbound direction.

(b) Middle Neebish Channel from Buoy 2 to Buoy 76 shall be used only by vessels proceeding in an upbound direction.

(c) Pipe Island Course from Sweets Point to Watson Reefs Light shall be used only by vessels proceeding in a downbound direction.

(d) Pipe Island Passage to the east of Pipe Island Shoal and north of Pipe Island Twins from Watson Reefs Light to Sweets Point shall be used only by vessels proceeding in an upbound direction.

§161.852 Meeting or overtaking in channels.

(a) No vessel 100 meters (350 feet) or greater in length shall overtake or approach within one quarter of a statute mile (0.2 nautical miles) of a vessel proceeding in the same direction when in the following channels:

(1) West Neebish Channel between Ninemile Point and Munuscong Lake Junction Lighted Bell Buoy.

(2) Middle Neebish Channel between Munuscong Lake Junction Lighted Bell Buoy and Ninemile Point.

(3) Little Rapids Cut from Six Mile Point to Buoy 102.

(b) In addition to paragraph (a) of this section, when two-way traffic is permitted in Middle Neebish Channel, no vessel 100 meters (350 feet) or greater in length shall meet or overtake another vessel in the vicinity of–

(1) Johnson Point from Buoy 18 to Buoy 22;

(2) Mirre Point from Buoy 26 to Buoy 28; and

(3) Stribling Point from Buoy 39 to Buoy 43.

(c) This section does not apply when navigating through ice fields.

§161.854 Winter navigation.

(a) During the winter navigation season, West Neebish Channel (from Buoy 53 to Buoy 1) and Pipe Island Passage to the east of Pipe Island Shoal and north of Pipe Island Twins (from Watson Reefs Light to Sweets Point) normally is closed to traffic. The COTP closes or opens these channels as ice conditions dictate after giving due consideration to the protection of the marine environment, waterway improvements, and aids to navigation, the need for cross channel traffic (e.g. ferry vessels), the availability of icebreakers, and the safety of island residents who, in the course of their daily business, must use naturally formed ice bridges for transportation to and from the mainland. Under normal seasonal conditions, only one closing each winter and one opening each spring are anticipated. Prior to closing or opening these channels, the COTP will give interested parties, including both shipping interests and island residents, not less than 72 hours notice.

(b) When West Neebish Channel is closed, Middle Neebish Channel (from Buoy 2 to Buoy 76) will either be opened to two-way traffic or open to one-way traffic in alternate directions. When two-way traffic is authorized in Middle Neebish Channel, all upbound vessels shall use the easterly 60 meters (197 feet) of the channel and all downbound vessels shall use the westerly 91 meters (295 feet) of the channel. When two-way traffic is authorized in Middle Neebish Channel, upbound vessels drawing more than 20 feet shall not proceed past Buoy 2 unless specifically authorized by Soo Control. When one-way traffic in alternate directions is authorized in Middle Neebish Channel, all vessels shall use the westerly 91 meters (295 feet) of the channel.

(c) When Pipe Island Passage is closed, Pipe Island Course is open to two-way traffic.

ANCHORAGE RULES

§161.860 Anchorage, general.

Vessels shall not be anchored so as to swing into the channel limits or across charted steering courses.

§161.862 Emergency anchoring.

In an emergency, vessels may anchor in a dredged channel. Vessels shall anchor as near the edge of the channel as possible and shall get underway as soon as the emergency ceases, unless otherwise directed. Soo Control must be advised of any emergency anchoring as soon as possible.

§161.864 Unauthorized anchorage.

No vessel shall anchor at any time in the area southward of the Point Aux Pins Range between Brush Point and the waterworks intake crib off Big Point or within a quarter of a statute mile (0.2 nautical mile) of the intake crib in any direction.

§161.866 Anchoring of dredging, construction, or wrecking plants in channels.

Dredging, construction, or wrecking plants may be permitted to anchor or moor in the channel under such conditions as the COTP deems appropriate to protect the safety of navigation.

§161.868 Shifting anchorage under direction of Soo Control.

Soo Control may direct any anchored vessel to shift anchorage whenever deemed necessary for the safety of vessels, the safe or expeditious passage of shipping, or the preservation or effective operation of Government installations.

§161.870 Order of departure from anchorage.

Vessels collected in any part of the VTS Area by reason of temporary closure of a channel or an impediment to navigation shall get underway and depart in the order in which they arrived, unless otherwise directed by Soo Control. Soo Control may advance any vessel in the order of departure to expedite the movement of mails, passengers, cargo of a perishable nature, to facilitate passage of vessels through any channel by reason of special circumstance, or to facilitate passage through the St. Marys Falls Canal.

SPEED RULES

§161.880 Maximum speed limits.

The following speed limits indicate speed over the ground (between points listed).

De Tour Reef Light and Sweets Point Light, 14 mph (12.2 knots);

Round Island Light and Point Aux Frenes Light 21, 14 mph (12.2 knots);

Munuscong Lake Lighted Buoy 8 and Everens Point, 12 mph (10.4 knots);

Everens Point and Reed Point, 9 mph (7.8 knots);

Reed Point and Lake Nicolet Lighted Buoy 62, 10 mph (8.7 knots);

Lake Nicolet Lighted Buoy 62 and Lake Nicolet Light 80, 12 mph (10.4 knots);

Lake Nicolet Light 80 and Winter Point (West Neebish Channel), 10 mph (8.7 knots);

Lake Nicolet Light 80 and Six Mile Point Range Rear Light, 10 mph (8.7 knots);

Six Mile Point Range Rear Light and lower limit of the St. Marys Falls Canal, 8 mph (7 knots) upbound, and 10 mph (8.7 knots) downbound;

Upper limit of the St. Marys Falls Canal and Point Aux Pins Main Light, 12 mph (10.4 knots).

§161.884 Temporary speed limits.

The Commander, Ninth Coast Guard District, may establish temporary speed limit regulations in the VTS area, including amendments to the speed limits under §161.880. The temporary speed limits established by the Commander, Ninth Coast Guard District, are published in the FEDERAL REGISTER and in Notices to Mariners.

§161.886 Minimum speed limit through dredged channels.

No vessel may make regular passage through any dredged channel at a speed of less than 5 statute miles per hour (4.3 knots) over the ground. Any vessel which cannot maintain this speed shall not enter any of the channels until permission has been granted by Soo Control.

MISCELLANEOUS RULES

§161.890 Rules for towing vessels.

(a) Towing vessels shall not drop their tows or otherwise leave them unattended south of Gros Cap Reef Light.

(b) Towing vessels engaged in shortening or lengthening tows, dropping or making up tows, transferring stores or cargo from boats alongside, or waiting shall stand clear and allow unobstructed passage to other vessels.

(c) Vessels of less than 61 meters (200 feet) in length shall not be towed with more than 76 meters (250 feet) of tow line. Vessels of 61 meters (200 feet) or more shall not be towed with a tow line longer than the length of the vessel plus 15 meters (50 feet).

§161.894 Channel closure and special rules.

Should channel obstructions or other conditions of unusual hazard so require, the COTP may order the closing of a channel, designate additional no-overtaking zones or areas of one-way traffic, or establish other temporary traffic rules. Should a channel be closed, vessels transiting in the direction of the closed channel shall make preparations to be able to immediately anchor.

Part 162–Inland Waterways Navigation Regulations

§162.110 Duluth-Superior Harbor, Minnesota and Wisconsin.

(a) No vessel greater than 100 feet in length may exceed 8 miles per hour in Duluth-Superior Harbor.

(b) In the Duluth Ship Canal:

(1) No vessel may meet or overtake another vessel if each vessel is greater than 150 feet in length (including tug and tow combinations).

(2) An inbound vessel has the right of way over an outbound vessel.

§162.115 Keweenaw Waterway, Michigan.

(a) No vessel greater than 40 feet in length may exceed 8 miles per hour between Lily Pond and Pilgrim Point.

(b) No vessel may use either the Portage River harbor of refuge or the Lily Pond harbor of refuge longer than 24 hours unless given permission to do so by the Captain of the Port.

§162.120 Harbors on Lake Michigan.

(a) No vessel greater than 40 feet in length may exceed 8 miles per hour in the harbors of Michigan City, Indiana; St. Joseph, South Haven, Saugatuck, Holland (Lake Macatawa), Grand Haven, Muskegon, White Lake, Pentwater, Ludington, Manistee, Portage Lake (Manistee County), Frankfort, Charlevoix, and Petoskey, Michigan.

(b) No vessel greater than 40 feet in length may exceed 4 miles per hour in the harbors of Menominee, Michigan and Wisconsin; Algoma, Kewaunee, Two Rivers, Manitowoc, Sheboygan, Port Washington, Milwaukee, Racine, Kenosha and Green Bay, Wisconsin; and Waukegan, Illinois.

§162.125 Sturgeon Bay and the Sturgeon Bay Ship Canal, Wisconsin.

(a) In the Sturgeon Bay Ship Canal:

(1) No vessel may exceed 5 miles per hour.

(2) No vessel greater than 150 feet in length (including tug and tow combinations) may come about.

(3) No vessel 65 feet or greater in length (including tug and tow combinations) may either:

(i) Enter or pass through the canal two or more abreast; or

(ii) Overtake another vessel.

(4) No vessel may anchor or moor unless given permission to do so by the Captain of the Port.

(5) Each vessel must keep to the center, except when meeting or overtaking another vessel.

(b) In Sturgeon Bay and the Sturgeon Bay Ship Canal:

(1) Each laden vessel under tow must be towed with at least two towlines. Each towline must be shortened to the extent necessary to provide maximum control of the tow.

(2) Each unladen vessel may be towed with one towline.

(3) No towline may exceed 100 feet in length.

(4) No vessel may tow another vessel alongside.

(5) No vessel may tow a raft greater than 50 feet in width.

Note.–The Corps of Engineers also has regulations dealing with these areas in 33 CFR 207.

§162.130 Connecting waters from Lake Huron to Lake Erie; general rules.

(a) Purpose. The regulations in sections 162.130 through 162.140 prescribe rules for vessel operation in U.S. waters connecting Lake Huron to Lake Erie (including the River Rouge) to prevent collisions and groundings, to protect waterway improvements, and to protect these waters from environmental harm resulting from collisions and groundings.

Note.–The Canadian Government has issued similar regulations which apply in the Canadian portion of the waterway. Provisions which apply only in Canadian waters are noted throughout the text.

(b) Applicability. (1) Unless otherwise specified, the rules in sections 162.130 through 162.140 apply to all U.S. vessels and all other vessels in U.S. waters.

(2) The speed rules in §162.138 apply to vessels 20 meters or more in length.

(3) The communications rules in §162.132, the traffic rules in §162.134, and the anchorage rules in §162.136 apply to the following vessels:

(i) Vessels of 20 meters or more in length;

(ii) Commercial vessels more than 8 meters in length engaged in towing another vessel astern, alongside, or by pushing ahead; and

(iii) Each dredge and floating plant.

(c) Definitions. As used in §§162.130 through 162.140–

"Captain of the Port" means the United States Coast Guard Captain of the Port of Detroit, Michigan.

"Detroit River" means the connecting waters from Windmill Point Light to the lakeward limits of the improved navigation channels at the head of Lake Erie.

"Harbor Master" means the harbor master appointed to the Windsor Harbor Commission.

""Lake St. Clair" means the waters from St. Clair Flats Canal Light 2 to Windmill Point Light at the head of the Detroit River.

"Master" means the licensed master or operator, the person designated by the master or operator to navigate the vessel, or, on a vessel not requiring licensed personnel, the person in command of the vessel.

"Regional Director General" means the Regional Director General for the Central Region, Canadian Coast Guard, Department of Transport.

"River Rouge" means the waters of the Short Cut Canal and the River Rouge from Detroit Edison Cell Light 1 to the head of navigation.

"St. Clair River" means the connecting waters from the lakeward limit of the improved navigation channel at the lower end of Lake Huron to St. Clair Flats Canal Light 2.

"SARNIA TRAFFIC" means the Canadian Coast Guard Traffic center at Sarnia, Ontario.

(d) Laws and regulations not affected. The regulations in §§162.130 through 162.140 do not relieve the owners or operators of vessels from complying with any other laws or regulations relating to navigation on the Great Lakes and their connecting or tributary waters.

(e) Local arrangements. The District Commander or the Captain of the Port may make local arrangements with appropriate Canadian officials, in the interest of safety of operations, to facilitate traffic movement and anchorage, to avoid disputes as to jurisdiction and to take necessary action to render assistance in emergencies.

§162.132 Connecting waters from Lake Huron to Lake Erie; communications rules.

(a) Radio Listening watch. The master of each vessel required to comply with this section shall continuously monitor–

(1) Channel 11 (156.55 MHz) between Lake Huron Cut Lighted Buoy 11 and Lake St. Clair Light; and

(2) Channel 12 (156.60 MHz) between Lake St. Clair Light and Detroit River Light.

(b) Radiotelephone equipment. Reports required by this section shall be made by the master using a radiotelephone capable of operation on a vessel's navigation bridge, or in the case of a dredge, from its main control station.

(c) English language. Reports required by this section shall be made in the English language.

(d) Traffic reports. (1) Reports required by this section shall be made to SARNIA TRAFFIC on the frequency designated for the radio listening watch in paragraph (a) of this section.

(2) Reports shall include the name of the vessel, location, intended course of action, and ETA at next reporting point.

(e) Permanent reporting points. Reports shall be made as indicated at the following points:

Lake Huron Cut Lighted Horn Buoy 11, downbound only.

Lake Huron Cut Lighted Buoy 7, downbound only.

Lake Huron Cut Lighted Buoy 1, upbound and downbound.

Port Huron Traffic Lighted Buoy, upbound and downbound.

Stag Island Upper Light, upbound only.

Marine City Salt Dock Light, downbound only.

Grand Pointe Light 23, upbound and downbound.

St. Clair Flats Canal Light 2, upbound and downbound.

Lake St. Clair Light, upbound and downbound.

Belle Isle Light, upbound and downbound.

Fighting Island Channel North Light, upbound and downbound.

Detroit River Light, upbound and downbound.

(f) Additional reports. (1) A report shall be made when departing any mooring or anchorage which is:

(i) In the St. Clair River between Lake Huron Cut Lighted Buoy 1 and Port Huron Traffic Lighted Buoy; or

(ii) In the Detroit River between Belle Isle Light and Fighting Island Channel North Light.

(2) A report shall be made before maneuvering to come about.

(3) A report shall be made–

(i) 20 minutes before entering the River Rouge or Short Cut Canal;

(ii) 20 minutes before departing any mooring in the River Rouge or Short Cut Canal; and

(iii) Immediately before entering or leaving the River Rouge or Short Cut Canal.

(g) Report of impairment or other hazard. The master of a vessel shall report to SARNIA TRAFFIC as soon as possible:

(1) Any condition on the vessel that may impair its navigation, including but not limited to: fire, defective steering equipment, or defective propulsion machinery.

(2) Any tow that the towing vessel is unable to control, or can control only with difficulty.

(h) Exemptions. Compliance with this section is not required when a vessel's radiotelephone equipment has failed.

§162.134 Connecting waters from Lake Huron to Lake Erie, traffic rules.

(a) Detroit River. The following traffic rules apply in the Detroit River:

(1) The West Outer Channel is restricted to downbound vessels.

(2) The Livingstone Channel, west of Bois Blanc Island, is restricted to downbound vessels.

Note.–The Amherstburg Channel, in Canadian waters east of Bois Blanc Island, is normally restricted to upbound vessels. No vessel may proceed downbound in the Amherstburg Channel without authorization from the Regional Director General.

(3) Between Fighting Island Channel South Light and Bar Point Pier Light 29D, no vessels shall meet or overtake in such a manner that more than two vessels would be abreast at any time.

(4) Between the west end of Belle Isle and Peche Island Light, vessels may overtake vessels engaged in towing.

(b) River Rouge. In the River Rouge, no vessel shall overtake another vessel.

(c) St. Clair River. The following traffic rules apply in the St. Clair River:

(1) Between St. Clair Flats Canal Light 2 and Russell Island Light 33, vessels may only overtake vessels engaged in towing.

(2) Between Lake Huron Cut Lighted Buoy 1 and Port Huron Traffic Lighted Buoy there is a zone of alternating one way traffic. Masters shall coordinate their movements in accordance with the following rules;

(i) Vessels shall not overtake.

(ii) Vessels shall not come about.

(iii) Vessels shall not meet.

(iv) Downbound vessels which have passed Lake Huron Cut Lighted Buoy 7 have the right of way over upbound vessels which have not reached the Port Huron Traffic Lighted Buoy. Upbound vessels awaiting transit of downbound vessels will maintain position south of the Port Huron Traffic Lighted Buoy.

(v) Vessels transiting the zone shall coordinate passage by using communication procedures in §162.132.

(vi) Transiting vessels shall have the right of way over moored vessels getting underway within the zone.

(d) In the waters described in §162.130(a), the District Commander or Captain of the Port may establish temporary traffic rules for reasons which include but are not limited to: channel obstructions, winter navigation, unusual weather conditions, or unusal water levels.

(e) The requirements of this section do not apply to public vessels of the U.S. or Canada engaged in icebreaking or servicing aids to navigation or to vessels engaged in river and harbor improvement work.

§162.136 Connecting waters from Lake Huron to Lake Erie; anchorage grounds.

(a) In the Detroit River, vessels shall be anchored so as not to swing into the channel or across steering courses.

Note.–There is an authorized anchorage in Canadian waters just above Fighting Island.

(b) In the St. Clair River, vessels shall be anchored so as not to swing into the channel or across steering courses.

§162.138 Connecting waters from Lake Huron to Lake Erie; speed rules.

(a) Maximum speed limit. Except when required for the safety of the vessel or any other vessel, vessels of 20 meters or more in length shall proceed at a speed not greater than–

(1) 12 statute miles per hour (10.4 knots) between Fort Gratiot Light and St. Clair Flats Canal Light 2;

(2) 12 statute miles per hour (10.4 knots) between Peche Island Light and Detroit River Light; and

(3) 4 statute miles per hour (3.5 knots) in the River Rouge.

Note.–The maximum speed limit is 5.8 statute miles per hour (5 knots) in the navigable channel south of Peche Island.

(b) Temporary speed limits. The District Commander may temporarily establish speed limits or temporarily amend existing speed limit regulations on the waters described in §162.130(a).

§162.140 Connecting waters from Lake Huron to Lake Erie; miscellaneous rules.

(a) Rules for towing vessels. (1) A towing vessel may drop or anchor its tows only in accordance with the provisions of 162.136.

(2) A towing vessel engaged in arranging its tow shall not obstruct the navigation of other vessels.

(b) Pilots. In the St. Clair River between Lake Huron Cut Lighted Buoy 1 and Port Huron Traffic Lighted Buoy, vessels shall not take on, discharge, or exchange pilots unless weather conditions would make the maneuver unsafe in the customary pilot area.

§162.145 Monroe Harbor, Michigan.

(a) In the lake channel, no vessel greater than 40 feet in length may exceed 10 miles per hour.

(b) In the river channel:

(1) No vessel greater than 40 feet in length may exceed 6 miles per hour.

(2) No vessel may use a towline exceeding 200 feet in length.

§162.150 Maumee Bay and River, Ohio.

(a) In Maumee Bay (lakeward of Maumee River Lighted Buoy 49 (L/L No. 770)), no vessel greater than 100 feet in length may exceed 12 miles per hour.

(b) In Maumee River (inward of Maumee River Lighted Buoy 49 (L/L No. 770)):

(1) No vessel greater than 40 feet in length may exceed 6 miles per hour.

(2) No vessel greater than 100 feet in length (including tug and tow combinations) may overtake another vessel.

§162.155 Sandusky and Huron Harbors, Ohio.

(a) In Sandusky Harbor, no vessel greater than 40 feet in length may exceed 10 miles per hour.

(b) In Huron Harbor, no vessel greater than 40 feet in length may exceed 6 miles per hour, except in the outer harbor where no vessel greater than 40 feet in length may exceed 10 miles per hour.

Note.–The Corps of Engineers also has regulations dealing with these areas in 33 CFR 207.

§162.160 Vermilion, Lorain, Cleveland, Fairport, Ashtabula, and Conneaut Harbors, Ohio.

(a) In Vermilion Harbor, no vessel may exceed 6 miles per hour.

(b) In Lorain, Cleveland, Fairport, Ashtabula, and Conneaut Harbors, no vessel may exceed 6 miles per hour, except in the outer harbors, where no vessel may exceed 10 miles per hour.

Note.–The Corps of Engineers also has regulations dealing with these areas in 33 CFR 207.

§162.165 Buffalo and Rochester Harbors, New York.

In Buffalo and Rochester Harbors, no vessel may exceed 6 miles per hour, except in the outer harbors where no vessel may exceed 10 miles per hour.

Note.–The Corps of Engineers also has regulations dealing with these areas in 33 CFR 207.

§162.175 Black Rock Canal and Lock at Buffalo, New York.

In the Black Rock Canal and Lock, no vessel may exceed 6 miles per hour.

Note.–The Corps of Engineers also has regulations dealing with these areas in 33 CFR 207.

Part 164–Navigation Safety Regulations (in part). For a complete description of this part see 33 CFR 164.

§164.01 Applicability.

(a) This part (except as specifically limited herein) applies to each self-propelled vessel of 1600 or more gross tons (except foreign vessels described in §164.02) when it is operating in the navigable waters of the United States except the St. Lawrence Seaway.

§164.02 Applicability exception for foreign vessels. (See 33 CFR 164.)

§164.03 Incorporation by reference. (See 33 CFR 164.)

§164.11 Navigation underway: General.

The owner, master, or person in charge of each vessel underway shall ensure that:

(a) The wheelhouse is constantly manned by persons who–

(1) Direct and control the movement of the vessel; and

(2) Fix the vessel's position;

(b) Each person performing a duty described in paragraph (a) of this section is competent to perform that duty;

(c) The position of the vessel at each fix is plotted on a chart of the area and the person directing the movement of the vessel is informed of the vessel's position;

(d) Electronic and other navigational equipment, external fixed aids to navigation, geographic reference points, and hydrographic contours are used when fixing the vessel's position;

(e) Buoys alone are not used to fix the vessel's position;

Note.–Buoys are aids to navigation placed in approximate positions to alert the mariner to hazards to navigation or to indicate the orientation of a channel. Buoys may not maintain an exact position because strong or varying currents, heavy seas, ice, and collisions with vessels can move or sink them or set them adrift. Although buoys may corroborate a position fixed by other means, buoys cannot be used to fix a position: however, if no other aids are available, buoys alone may be used to establish an estimated position.

(f) The danger of each closing visual or each closing radar contact is evaluated and the person directing the movement of the vessel knows the evaluation;

(g) Rudder orders are executed as given;

(h) Engine speed and direction orders are executed as given;

(i) Magnetic variation and deviation and gyrocompass errors are known and correctly applied by the person directing the movement of the vessel;

(j) A person whom he has determined is competent to steer the vessel is in the wheelhouse at all times (See also 46 U.S.C. 672, which requires an able seaman at the wheel on U.S. vessels of 100 gross tons or more in narrow or crowded waters or during low visibility.);

(k) If a pilot other than a member of the vessel's crew is employed, the pilot is informed of the draft, maneuvering characteristics, and peculiarities of the vessel and of any abnormal circumstances on the vessel that may affect its safe navigation.

(l) Current velocity and direction for the area to be transited are known by the person directing the movement of the vessel;

(m) Predicted set and drift are known by the person directing movement of the vessel;

(n) Tidal state for the area to be transited is known by the person directing movement of the vessel;

(o) The vessel's anchors are ready for letting go;

(p) The person directing the movement of the vessel sets the vessel's speed with consideration for–

(1) The prevailing visibility and weather conditions;

(2) The proximity of the vessel to fixed shore and marine structures;

(3) The tendency of the vessel underway to squat and suffer impairment of maneuverability when there is small underkeel clearance;

(4) The comparative proportions of the vessel and the channel;

(5) The density of marine traffic;

(6) The damage that might be caused by the vessel's wake;

(7) The strength and direction of the current; and

(8) Any local vessel speed limit;

(q) The tests required by §164.25 are made and recorded in the vessel's log; and

(r) The equipment required by this part is maintained in operable condition.

(s) Upon entering U.S. waters, the steering wheel or lever on the navigating bridge is operated to determine if the steering equipment is operating properly under manual control, unless the vessel has been steered under manual control from the navigating bridge within the preceding 2 hours, except when operating on the Great Lakes and their connecting and tributary waters.

(t) At least two of the steering gear power units on the vessel are in operation when such units are capable of simultaneous operation, except when operating on the Great Lakes and their connecting and tributary waters.

§164.19 Requirements for vessels at anchor.

The master or person in charge of each vessel that is anchored shall ensure that–

(a) A proper anchor watch is maintained;

(b) Procedures are followed to detect a dragging anchor; and

(c) Whenever weather, tide, or current conditions are likely to cause the vessel's anchor to drag, action is taken to ensure the safety of the vessel, structures, and other vessels, such as being ready to veer chain, let go a second anchor, or get underway using the vessel's own propulsion or tug assistance.

§164.25 Tests before entering or getting underway.

(a) Except as provided in paragraphs (b) and (c) of this section no person may cause a vessel to enter into or get underway on the navigable waters of the United States unless no more than 12 hours before entering or getting underway, the following equipment has been tested:

(1) Primary and secondary steering gear. The test procedure includes a visual inspection of the steering gear and its connecting linkage, and, where applicable, the operation of the following:

(i) Each remote steering gear control system.

(ii) Each steering position located on the navigating bridge.

(iii) The main steering gear from the alternative power supply, if installed.

(iv) Each rudder angle indicator in relation to the actual position of the rudder.

(v) Each remote steering gear control system power failure alarm.

(vi) Each remote steering gear power unit failure alarm.

(vii) The full movement of the rudder to the required capabilities of the steering gear.

(2) All internal vessel control communications and vessel control alarms.

(3) Standby or emergency generator, for as long as necessary to show proper functioning, including steady state temperature and pressure readings.

(4) Storage batteries for emergency lighting and power systems in vessel control and propulsion machinery spaces.

(5) Main propulsion machinery, ahead and astern.

(b) Vessels navigating on the Great Lakes and their connecting and tributary waters, having once completed the test requirements of this sub-part, are considered to remain in compliance until arriving at the next port of call on the Great Lakes.

(c) Vessels entering the Great Lakes from the St. Lawrence Seaway are considered to be in compliance with this sub-part if the required tests are conducted preparatory to or during the passage of the St. Lawrence Seaway or within one hour of passing Wolfe Island.

(d) No vessel may enter, or be operated on the navigable waters of the United States unless the emergency steering drill described below has been conducted within 48 hours prior to entry and logged in the vessel logbook, unless the drill is conducted and logged on a regular basis at least once every three months. This drill must include at a minimum the following:

(1) Operation of the main steering gear from within the steering gear compartment.

(2) Operation of the means of communications between the navigating bridge and the steering compartment.

(3) Operation of the alternative power supply for the steering gear if the vessel is so equipped.

§164.30 Charts, publications, and equipment: General.

No person may operate or cause the operation of a vessel unless the vessel has the marine charts, publications, and equipment as required by §§164.33 through 164.41 of this part.

§164.33 Charts and publications.

(a) Each vessel must have the following:

(1) Marine charts of the area to be transited, published by the National Ocean Service, U.S. Army Corps of Engineers, or a river authority that–

(i) Are of a large enough scale and have enough detail to make safe navigation of the area possible; and

(ii) Are currently corrected.

(2) For the area to be transited, a currently corrected copy of, or applicable currently corrected extract from, each of the following publications:

(i) U.S. Coast Pilot.

(ii) Coast Guard Light List.

(3) For the area to be transited, the current edition of, or applicable current extract from:

(i) Tide tables published by the National Ocean Service.

(ii) Tidal current tables published by the National Ocean Service, or river current publication issued by the U.S. Army Corps of Engineers, or a river authority.

(b) As an alternative to the requirements for paragraph (a) of this section, a marine chart or publication, or applicable extract, published by a foreign government may be substituted for a U.S. chart and publication required by this section. The chart must be of large enough scale and have enough detail to make safe navigation of the area possible, and must be currently corrected. The publication, or applicable extract, must singly or in combination contain similar information to the U.S. Government publication to make safe navigation of the area possible. The publication, or applicable extract must be currently corrected, with the exceptions of tide and tidal current tables, which must be the current editions.

(c) As used in this section, "currently corrected" means corrected with changes contained in all Notices to Mariners published by Defense Mapping Agency Hydrographic/Topographic Center, or an equivalent foreign government publication, reasonably available to the vessel, and that is applicable to the vessel's transit.

§164.35 Equipment: All vessels.

Each vessel must have the following:

(a) A marine radar system for surface navigation.

(b) An illuminated magnetic steering compass, mounted in a binnacle, that can be read at the vessel's main steering stand.

(c) A current magnetic compass deviation table or graph or compass comparison record for the steering compass, in the wheelhouse.

(d) A gyrocompass.

(e) An illuminated repeater for the gyrocompass required by paragraph (d) of this section that is at the main steering stand, unles that gyrocompass is illuminated and is at the main steering stand.

(f) An illuminated rudder angle indicator in the wheelhouse.

(g) The following maneuvering information prominently displayed on a fact sheet in the wheelhouse:

(1) A turning circle diagram to port and starboard that shows the time and distance and advance and transfer required to alter course 90 degrees with maximum rudder angle and constant power settings, for either full and half speeds, or for full and slow speeds. For vessels whose turning circles are essentially the same for both directions, a diagram showing a turning circle in one direction, with a note on the diagram stating that turns to port and starboard are essentially the same, may be substituted.

(2) The time and distance to stop the vessel from either full and half speeds, or from full and slow speeds, while maintaining approximately the initial heading with minimum application of rudder.

(3) For each vessel with a fixed propeller, a table of shaft revolutions per minute for a representative range of speeds.

(4) For each vessel with a controllable pitch propeller, a table of control settings for a representative range of speeds.

(5) For each vessel that is fitted with an auxiliary device to assist in maneuvering, such as a bow thruster, a table of vessel speeds at which the auxiliary device is effective in maneuvering the vessel.

(6) The maneuvering information for the normal load and normal ballast condition for–

(i) Calm weather-wind 10 knots or less, calm sea;

(ii) No current;

(iii) Deep water conditions-water depth twice the vessel's draft or greater; and

(iv) Clean hull.

(7) At the bottom of the fact sheet, the following statement:

Warning.

The response of the (name of the vessel) may be different from that listed above if any of the following conditions, upon which the maneuvering information is based, are varied:

(1) Calm weather-wind 10 knots or less, calm sea;

(2) No current;

(3) Water depth twice the vessel's draft or greater;

(4) Clean hull; and

(5) Intermediate drafts or unusual trim.

(h) An echo depth sounding device.

(i) A device that can continuously record the depth readings of the vessel's echo depth sounding device, except when operating on the Great Lakes and their connecting and tributary waters.

(j) Equipment on the bridge for plotting relative motion.

(k) Simple operating instructions with a block diagram, showing the changeover procedures for remote steering gear control systems and steering gear power units, permanently displayed on the navigating bridge and in the steering gear compartment.

(l) An indicator readable from the centerline conning position showing the rate of revolution of each propeller, except when operating on the Great Lakes and their connecting and tributary waters.

(m) If fitted with controllable pitch propellers, an indicator readable from the centerline conning position showing the pitch and operational mode of such propellers, except when operating on the Great Lakes and their connecting and tributary waters.

(n) If fitted with lateral thrust propellers, an indicator readable from the centerline conning position showing the direction and amount of thrust of such propellers, except when operating on the Great Lakes and their connecting and tributary waters.

§164.37 Equipment: Vessels of 10,000 gross tons or more.

(a) Each vessel of 10,000 gross tons or more must have, in addition to the radar system under §164.35(a), a second marine radar system that operates independently of the first.

Note.–Independent operation means two completely separate systems, from separate branch power supply circuits or distribution panels to antennas, so that failure of any component of one system will not render the other system inoperative.

(b) On each tanker of 10,000 gross tons or more that is subject to Section 5 of the Port and Tanker Safety Act of 1978 (46 U.S.C. 391a), the dual radar system required by this part must have a short range capability and a long range capability; and each radar must have true north features consisting of a display that is stabilized in azimuth.

§164.38 Automatic radar plotting aids (ARPA). (See 33 CFR 164.)

§164.39 Steering gear: Tankers. (See 33 CFR 164.)

§164.40 Devices to indicate speed and distance. (See 33 CFR 164.)

§164.40 Devices to indicate speed and distance. (See 33 CFR 164.)

§164.41 Electronic position fixing devices.

(a) Each vessel calling at a port in the continental United States, including Alaska south of Cape Prince of Wales, except each vessel owned or bareboat chartered and operated by the United States, or by a state or its political subdivision, or by a foreign nation, and not engaged in commerce, must have one of the following:

(1) A Type I or II LORAN C receiver as defined in Section 1.2(e), meeting Part 2 (Minimum Performance Standards) of the Radio Technical Commission for Marine Services (RTCM) Paper 12-78/DO-100 dated December 20, 1977, entitled "Minimum Performance Standards) (MPS) Marine Loran-C Receiving Equipment". Each receiver installed on or after June 1, 1982, must have a label with the information required under paragraph (b) of this section. If the receiver is installed before June 1, 1982, the receiver must have the label with the information required under paragraph (b) by June 1, 1985.

(2) A satellite navigation receiver with:

(i) Automatic acquisition of satellite signals after initial operator settings have been entered; and

(ii) Position updates derived from satellite information during each usable satellite pass.

(3) A system that is found by the Commandant to meet the intent of the statements of availability, coverage, and accuracy for the U.S. Coastal Confluence Zone (CCZ) contained in the U.S. "Federal Radionavigation Plan" (Report No. DOD-NO 4650.4–P, I or No. DOT-TSC-RSPA-80-16, I). A person desiring a finding by the Commandant under this subparagraph must submit a written application describing the device to: Commandant (G-WWM), U.S. Coast Guard, Washington, D.C. 20593. After reviewing the application, the Commandant may request additional information to establish whether or not the device meets the intent of the Federal Radionavigation Plan.

Note.–The Federal Radionavigation Plan is available from the National Technical Information Service, Springfield, Va. 22161, with the following Government Accession Numbers:

Vol 1, ADA 116468
Vol 2, ADA 116469
Vol 3, ADA 116470
Vol 4, ADA 116471

(b) Each label required under paragraph (a)(1) of this section must show the following:

(1) The name and address of the manufacturer.

(2) The following statement by the manufacturer:

This receiver was designed and manufactured to meet Part 2 (Minimum Performance Standards) of the RTCM MPS for Marine Loran-C Receiving Equipment.

§164.42 Rate of turn indicator.

Each vessel of 100,000 gross tons or more constructed on or after September 1, 1984, shall be fitted with a rate of turn indicator.

§164.51 Deviations from rules: Emergency.

Except for the requirements of §164.53(b), in an emergency, any person may deviate from any rule in this part to the extent necessary to avoid endangering persons, property, or the environment.

§164.53 Deviations from rules and reporting: Non-operating equipment.

(a) If during a voyage any equipment required by this part stops operating properly, the person directing the movement of the vessel may continue to the next port of call, subject to the directions of the District Commander or the Captain of the Port, as provided by 33 CFR 160.

(b) If the vessel's radar, radio navigation receivers, gyrocompass, echo depth sounding device, or primary steering gear stops operating properly, the person directing the movement of the vessel must report or cause to be reported that it is not operating properly to the nearest Captain of the Port, District Commander, or, if participating in a Vessel Traffic Service, to the Vessel Traffic Center, as soon as possible.

§164.55 Deviations from rules: Continuing operation or period of time.

The Captain of the Port, upon written application, may authorize a deviation from any rule in this part if he determines that the deviation does not impair the safe navigation of the vessel under anticipated conditions and will not result in a violation of the rules for preventing collisions at sea. The authorization may be issued for vessels operating in the waters under the jurisdiction of the Captain of the Port for any continuing operation or period of time the Captain of the Port specifies.

§164.61 Marine casualty reporting and record retention.

When a vessel is involved in a marine casualty as defined in 46 CFR 4.03-1, the master or person in charge of the vessel shall–

(a) Ensure compliance with 46 CFR 4.05, "Notice of Marine Casualty and Voyage Records," and

(b) Ensure that the voyage records required by 46 CFR 4.05-15 are retained for–

(1) 30 days after the casualty if the vessel remains in the navigable waters of the United States; or

(2) 30 days after the return of the vessel to a United States port if the vessel departs the navigable waters of the United States within 30 days after the marine casualty.

Part 165–Regulated Navigation Areas and Limited Access Areas

Subpart A–General

§165.1 Purpose of part.

The purpose of this part is to–

(a) Prescribe procedures for establishing different types of limited or controlled access areas and regulated navigation areas;

(b) Prescribe general regulations for different types of limited or controlled access areas and regulated navigation areas;

(c) Prescribe specific requirements for established areas; and

(d) List specific areas and their boundaries.

§165.5 Establishment procedures.

(a) A safety zone, security zone, or regulated navigation area may be established on the initiative of any authorized Coast Guard official.

(b) Any person may request that a safety zone, security zone, or regulated navigation area be established. Except as provided in paragraph (c) of this section, each request must be submitted in writing to either the Captain of the Port or District Commander having jurisdiction over the location as described in 33 CFR 3, and include the following:

(1) The name of the person submitting the request;

(2) The location and boundaries of the safety zone, security zone, or regulated navigation area;

(3) The date, time, and duration that the safety zone, security zone, or regulated navigation area should be established;

(4) A description of the activities planned for the safety zone, security zone, or regulated navigation area;

(5) The nature of the restrictions or conditions desired; and

(6) The reason why the safety zone, security zone, or regulated navigation area is necessary.

(Requests for safety zones, security zones, and regulated navigation areas are approved by the Office of Management and Budget under control numbers 2115-0076, 2115-0219, and 2115-0087.)

(c) Safety Zones and Security Zones. If, for good cause, the request for a safety zone or security zone is made less than 5 working days before the zone is to be established, the request may be made orally, but it must be followed by a written request within 24 hours.

§165.7 Notification.

(a) The establishment of these limited access areas and regulated navigation areas is considered rulemaking. The procedures used to notify persons of the establishment of these areas vary depending upon the circumstances and emergency conditions. Notification may be made by marine broadcasts, local notice to mariners, local news media, distribution in leaflet form, and on-scene oral notice, as well as publication in the Federal Register.

(b) Notification normally contains the physical boundaries of the area, the reasons for the rule, its estimated duration, and the method of obtaining authorization to enter the area, if applicable, and special navigational rules, if applicable.

(c) Notification of the termination of the rule is usually made in the same form as the notification of its establishment.

Subpart B–Regulated Navigation Areas

§165.10 Regulated navigation area.

A regulated navigation area is a water area within a defined boundary for which regulations for vessels navigating within the area have been established under this part.

§165.11 Vessel operating requirements (regulations).

Each District Commander may control vessel traffic in an area which is determined to have hazardous conditions, by issuing regulations -

(a) Specifying times of vessel entry, movement, or departure to, from, within, or through ports, harbors, or other waters;

(b) Establishing vessel size, speed, draft limitations, and operating conditions; and

(c) Restricting vessel operation, in a hazardous area or under hazardous conditions, to vessels which have particular operating characteristics or capabilities which are considered necessary for safe operation under the circumstances.

§165.13 General regulations.

(a) The master of a vessel in a regulated navigation area shall operate the vessel in accordance with the regulations contained in Subpart F.

(b) No person may cause or authorize the operation of a vessel in a regulated navigation area contrary to the regulations in this Part.

Subpart C–Safety Zones

§165.20 Safety zones.

A Safety Zone is a water area, shore area, or water and shore area to which, for safety or environmental purposes, access is limited to authorized persons, vehicles, or vessels. It may be stationary and described by fixed limits or it may be described as a zone around a vessel in motion.

§165.23 General regulations.

Unless otherwise provided in this part–

(a) No person may enter a safety zone unless authorized by the COTP or the District Commander;

(b) No person may bring or cause to be brought into a safety zone any vehicle, vessel, or object unless authorized by the COTP or the District Commander;

(c) No person may remain in a safety zone or allow any vehicle, vessel, or object to remain in a safety zone unless authorized by the COTP or the District Commander; and

(d) Each person in a safety zone who has notice of a lawful order or direction shall obey the order or direction of the COTP or District Commander issued to carry out the purposes of this subpart.

Subpart D–Security Zones

§165.30 Security zones.

(a) A security zone is an area of land, water, or land and water which is so designated by the Captain of the Port or District Commander for such time as is necessary to prevent damage or injury to any vessel or waterfront facility, to safeguard ports, harbors, territories, or waters of the United States or to secure the observance of the rights and obligations of the United States.

(b) The purpose of a security zone is to safeguard from destruction, loss, or injury from sabotage or other subversive acts, accidents, or other causes of a similar nature–

(1) Vessels,

(2) Harbors,

(3) Ports and

(4) Waterfront facilities in the United States and all territory and water, continental or insular, that is subject to the jurisdiction of the United States.

§165.33 General regulations.

Unless otherwise provided in the special regulations in Subpart F of this part–

(a) No person or vessel may enter or remain in a security zone without the permission of the Captain of the Port;

(b) Each person and vessel in a security zone shall obey any direction or order of the Captain of the Port;

(c) The Captain of the Port may take possession and control of any vessel in the security zone;

(d) The Captain of the Port may remove any person, vessel, article, or thing from a security zone;

(e) No person may board, or take or place any article or thing on board, any vessel in a security zone without the permission of the Captain of the Port; and

(f) No person may take or place any article or thing upon any waterfront facility in a security zone without the permission of the Captain of the Port.

Subpart E–Restricted Waterfront Areas

§165.40 Restricted Waterfront Areas.

The Commandant, may direct the COTP to prevent access to waterfront facilities, and port and harbor areas, including vessels and harbor craft therein. This section may apply to persons who do not possess the credentials outlined in 33 CFR 125.09 when certain shipping activities are conducted that are outlined in 33 CFR 125.15.

Subpart F–Specific Regulated Navigation Areas and Limited Access Areas

§165.901 Great Lakes-regulated navigation areas.

(a) Lake Huron. The following are regulated navigation areas

(1) The waters of Lake Huron known as South Channel between Bois Blanc Island and Cheboygan, Michigan; bounded by a line north from Cheboygan Crib Light (LL-1340) at 45°39'48"N., 84°27'36"W.; to Bois Blanc Island at 45°43'42"N., 84°27'36"W.; and a line north from the mainland at 45°43'00"N., 84°35'30"W.; to the western tangent of Bois Blanc Island at 45°48'42"N., 84°35'30"W.

(2) The waters of Lake Huron between Mackinac Island and St. Ignace, Michigan, bounded by a line east from position 45°52'12"N., 84°43'00"W.; to Mackinac Island at 45°52'12"N., 84°39'00"W.; and a line east from the mainland at 45°53'12"N., 84°43'30"W.; to the northern tangent of Mackinac Island at 45°53'12"N., 84°38'48"W.

(b) Lake Michigan. The following is a regulated navigation area-The waters of Lake Michigan known as Gray's Reef Passage bounded by a line from Gray's Reef Light (LL-2006) at 45°46'00"N., 85°09'12"W.; to White Shoals Light (LL-2003) at 45°50'30"N., 85°08'06"W.; to a point at 45°49'12"N., 85°04'48"W.; then to a point at 45°45'42"N., 85°08'42"W.; then to the point of beginning.

(c) Regulations. The COTP, Sault Ste. Marie, will close and open these regulated navigation areas as ice conditions dictate. Under normal seasonal conditions, only one closing each winter and one opening each spring are anticipated. Prior to the closing or opening of the regulated navigation areas, the COTP will give interested parties, including both shipping interests and island residents, not less than 72 hours notice of the action. No vessel may navigate in a regulated navigation area which has been closed by the COTP. Under emergency conditions, the COTP may authorize specific vessels to navigate in a closed regulated navigation area.

§165.902 Niagara River at Niagara Falls, New York-safety zone.

(a) The following is a Safety Zone-The United States waters of the Niagara River from the crest of the American and Horseshoe Falls, Niagara Falls, New York to a line drawn across the Niagara River from the downstream side of the mouth of Gill Creek to the upstream end of the breakwater at the mouth of the Welland River.

Part 207–Navigation Regulations

§207.50 Hudson River Lock at Troy, N.Y.; navigation.

(a) Authority of lockmaster. The lockmaster shall be charged with the immediate control and management of the lock, and of the area set aside as the lock area, including the lock approach channels. He shall see that all laws, rules and regulations for the use of the lock and lock area are duly complied with, to which end he is authorized to give all necessary orders and directions in accordance therewith, both to employees of the Government and to any and every person within the limits of the lock or lock area, whether navigating the lock or not. No one shall cause any movement of any vessel, boat, or other floating thing in the lock or approaches except by or under the direction of the lockmaster or his assistants.

(b) Signals.–Steamboats or tows desiring lockage in either direction shall give notice to the locktenders, when not more than three-fourths mile from the lock, by one long blast (of 10 seconds' duration), followed by one short blast (of three seconds' duration), of a whistle or horn. When the lock is ready for entrance a green light will be shown from the river wall. An amber light will indicate that the lock is being made ready for entrance. A red light will indicate that the approaching vessel must wait. Whenever local conditions make it advisable, the visual signals will be supplemented by sound signals as follows:

(1) One long blast of a horn to indicate that the vessel must wait.

(2) One short blast of a horn to indicate that the lock is being made ready for entrance.

(3) Two short blasts of a horn to indicate permission to enter the lock.

(4) Four short and rapid blasts to attract attention, indicate caution, and signal danger.

(c) Draft of boats. Deep-draft boats must clear the miter sills by at least 3 inches. Boats drawing too much water will not be allowed to lighter cargo in the entrances.

(d) Precedence at the lock. The vessel arriving first at the lock shall be first to lock through; but precedence shall be given to vessels belonging to the United States and to commercial vessels in the order named. Arrival posts or markers may be established ashore above or below the lock. Vessels arriving at or opposite such posts or markers will be considered as having arrived at the lock within the meaning of this paragraph. If the traffic is crowded in both directions, up and down lockages will usually be made alternately, but the locktender may permit two or more lockages to be made at one time in the same direction when this will not cause unreasonable delay. In case two or more boats or tows are to enter for the same lockage, they shall enter as directed by the locktender. No boat shall run ahead of another while in the lock. The boat that enters first shall leave first.

(e) Lockage of pleasure boats. The lockage of pleasure boats, house boats or like craft shall be expedited by locking them through with commercial craft (other than barges carrying gasoline or highly hazardous materials) in order to utilize the capacity of the lock to its maximum. Lockage of pleasure craft may be made with commercial craft carrying petroleum products other than gasoline, provided a clear distance of at least 100 feet between such vessels can be maintained in the lock. If, after the arrival of such craft, no separate or combined lockage can be accomplished within a reasonable time, not to exceed the time required for three other lockages, then separate lockage shall be made.

(f) Stations while waiting. Boats waiting their turn to enter the lock must lie at a sufficient distance from the lock and in such a position as to leave sufficient room for the passage of boats leaving the lock.

(g) Unnecessary delay. (1) Boats must not cause delay in entering or leaving the lock. Masters and pilots will be held to a strict accountability in this matter, and those with tows must provide enough men to move barges promptly. Boats failing to enter the lock with reasonable promptness after being signaled will lose their turn.

(2) Tugboats arriving with their tows in a condition which will delay locking shall lose their turn if so ordered by the lock tender. Leaking boats may be excluded until put in shape to be passed through safely.

(h) Mooring. Boats in the lock or waiting in the entrance shall be moored where directed by the lock tender, by bow, stern, and spring lines, to the snubbing posts or line hooks. Tying boats to the lock ladders is strictly prohibited.

(i) Protection of lock gates. Boats will not be permitted to enter or leave the lock until the lock gates are at rest in the gate recesses and the lock tender has directed the boat to start.

(j) Damage to walls, etc. All craft passing through the lock must be free from projections or sharp corners which might scar the walls or injure other parts. Steamboats must be provided with suitable fenders, etc. One man shall be kept at the head of every tow till it has cleared the lock and guide walls, and shall use the fender to prevent scarring the walls.

(k) Handling machinery. None but employees of the United States will be allowed to move any valve, gate, or other machinery belonging to the lock.

(l) Refuse in lock. Throwing ashes, refuse, or other obstruction in the entrances or in the lock, or on the walls thereof, and passing coal from flats or barges to a steam boat while in the lock is prohibited.

(m) Commercial statistics. Masters or clerks of boats shall furnish in writing to lock tenders such statistics of passengers and cargoes as may be required.

(n) Trespass on United States property. Trespass on United States property, or willful injury to the banks, masonry, fences, trees, houses, machinery, or other property of the United States at or near the lock is strictly prohibited.

(o) Penalties.–In addition to the penalties prescribed by law, boats which fail to comply with the regulations in this section will thereafter be refused lockage until assurances have been received, satisfactory to the District Engineer, Corps of Engineers, New York, N.Y., that the regulations will be complied with.

§207.300 Ohio River, Mississippi River above Cairo, Ill.; and their tributaries; use, administration, and navigation.

(a) Authority of Lockmasters.–(1) Locks Staffed with Government Personnel. The provisions of this paragraph apply to all waterways in this section except for Cordell Hull Lock located at Mile 313.5 on the Cumberland River in Tennesee. The lockmaster shall be charged with the immediate control and management of the lock, and of the area set aside as the lock area, including the lock approach channels. He/she shall see that all laws, rules, and regulations for the use of the lock and lock area are duly complied with, to which end he/she is authorized to give all necessary orders and directions in accordance therewith, both to employees of the Government and to any and every person within the limits of the lock or lock area, whether navigating the lock or not. No one shall cause any movement of any vessel, boat, or other floating thing in the lock or approaches except by or under the direction of the lockmaster or his/her assistants. In the event of an emergency, the lockmaster may depart from these regulations as he deems necessary. The lockmasters shall also be charged with the control and management of federally constructed mooring facilities.

(2) Locks Staffed with Contract Personnel. The provisions of this paragraph apply to Cordell Hull Lock located at Mile 313.5 on the Cumberland River in Tennessee. Contract personnel shall give all necessary orders and directions for operations of the lock. No one shall cause any movement of any vessel, boat or other floating thing in the locks or approaches except by or under the direction of the contract lock operator. All duties and responsibilities of the lockmaster set forth in this section shall be performed by the contract lock operator except that responsibility for enforcing all laws, rules, and regulations shall be vested in a government employee designated by the Nashville District Engineer. The district engineer will notify waterway users and the general public through appropriate notices and media concerning the location and identity of the designated government employee.

(b) Safety rules for vessels using navigation locks. The following safety rules are hereby prescribed for vessels in the locking process, including the act of approaching or departing a lock:

(1) Tows with flammable or hazardous cargo barges, loaded or empty. (i) Stripping barges or transferring cargo is prohibited.

(ii) All hatches on barges used to transport flammable or hazardous materials shall be closed and latched, except those barges carrying a gas-free certificate.

(iii) Spark-proof protective rubbing fenders ("possums") shall be used.

(2) All vessels. (i) Leaking vessels may be excluded from locks until they have been repaired to the satisfaction of the lockmaster.

(ii) Smoking, open flames, and chipping or other spark-producing activities are prohibited on deck during the locking cycle.

(iii) Painting will not be permitted in the lock chamber during the locking cycle.

(iv) Tow speeds shall be reduced to a rate of travel such that the tow can be stopped by checking should mechanical difficulties develop. Pilots should check with the individual lockmasters concerning prevailing conditions. It is also recommended that pilots check their ability to reverse their engines prior to beginning an approach. Engines shall not be turned off in the lock until the tow has stopped and been made fast.

(v) U.S. Coast Guard regulations require all vessels to have on board life saving devices for prevention of drowning. All crew members of vessels required to carry work vests (life jackets) shall wear them during a lockage, except those persons in an area enclosed with a handrail or other device which would reasonably preclude the possibility of falling overboard. All deckhands handling lines during locking procedure shall wear a life jacket. Vessels not required by Coast Guard regulations to have work vests aboard shall have at least the prescribed life saving devices, located for ready access and use if needed. The lockmaster may refuse lockage to any vessel which fails to conform to the above.

(c) Reporting of navigation incidents. In furtherance of increased safety on waterways the following safety rules are hereby prescribed for all navigation interests:

(1) Any incident resulting in uncontrolled barges shall immediately be reported to the nearest lock. The report shall include information as to the number of loose barges, their cargo, and the time and location where they broke loose. The lockmaster or locks shall be kept informed of the progress being made in bringing the barges under control so that he can initiate whatever actions may be warranted.

(2) Whenever barges are temporarily moored at other than commercial terminals or established fleeting areas, and their breaking away could endanger a lock, the nearest lock shall be so notified, preferably the downstream lock.

(3) Sunken or sinking barges shall be reported to

the nearest lock both downstream and upstream of the location in order that other traffic passing those points may be advised of the hazards.

(4) In the event of an oil spill, notify the nearest lock downstream, specifying the time and location of the incident, type of oil, amount of spill, and what recovery or controlling measures are being employed.

(5) Any other activity on the waterways that could conceivably endanger navigation or a navigation structure shall be reported to the nearest lock.

(6) Whenever it is necessary to report an incident involving uncontrolled, sunken or sinking barges, the cargo in the barges shall be accurately identified.

(d) Precedence at locks. (1) The vessel arriving first at a lock shall normally be first to lock through, but precedence shall be given to vessels belonging to the United States. Licensed commercial passenger vessels operating on a published schedule or regularly operating in the "for hire" trade shall have precedence over cargo tows and like craft. Commercial cargo tows shall have precedence over recreational craft, except as described in paragraph (f) of this section.

(2) Arrival posts or markers may be established ashore above and/or below the locks. Vessels arriving at or opposite such posts or markers will be considered as having arrived at the locks within the meaning of this paragraph. Precedence may be established visually or by radio communication. The lockmaster may prescribe such departure from the normal order of precedence as in his judgment is warranted to achieve best lock utilization.

(e) Unnecessary delay at locks. Masters and pilots must use every precaution to prevent unnecessary delay in entering or leaving locks. Vessels failing to enter locks with reasonable promptness when signalled to do so shall lose their turn. Rearranging or switching of barges in the locks or in approaches is prohibited unless approved or directed by the lockmaster. This is not meant to curtail "jackknifing" or set-overs where normally practiced.

(f) Lockage of recreational craft. In order to fully utilize the capacity of the lock, the lockage of recreational craft shall be expedited by locking them through with commercial craft, provided that both parties agree to joint use of the chamber. When recreational craft are locked simultaneously with commercial tows, the lockmaster will direct, whenever practicable, that the recreational craft enter the lock and depart while the tow is secured in the lock. Recreational craft will not be locked through with vessels carrying volatile cargoes or other substances likely to emit toxic or explosive vapors. If the lockage of recreation craft cannot be accomplished within the time required for three other lockages, a separate lockage of recreational craft shall be made. Recreational craft operators are advised that many locks have a pull chain located at each end of the lock which signals the lockmaster that lockage is desired. Furthermore, many Mississippi River locks utilize a strobe light at the lock to signal recreational type vessels that the lock is ready for entry. Such lights are used exclusively to signal recreational craft.

(g) Simultaneous lockage of tows with dangerous cargoes. Simultaneous lockage of other tows with tows carrying dangerous cargoes or containing flammable vapors normally will only be permitted when there is agreement between the lockmaster and both vessel masters that the simultaneous lockage can be executed safely. He shall make a separate decision each time such action seems safe and appropriate, provided:

(1) The first vessel or tow in and the last vessel or tow out are secured before the other enters or leaves.

(2) Any vessel or tow carrying dangerous cargoes is not leaking.

(3) All masters involved have agreed to the joint use of the lock chamber.

(h) Stations while awaiting a lockage. Vessels awaiting their turn to lock shall remain sufficiently clear of the structure to allow unobstructed departure for the vessel leaving the lock. However, to the extent practicable under the prevailing conditions, vessels and tows shall position themselves so as to minimize approach time when signaled to do so.

(i) Stations while awaiting access through navigable pass. When navigable dams are up or are in the process of being raised or lowered, vessels desiring to use the pass shall wait outside the limits of the approach points unless authorized otherwise by the lockmaster.

(j) Signals. Signals from vessels shall ordinarily be by whistle; signals from locks to vessels shall be by whistle, another sound device, or visual means. When a whistle is used, long blasts of the whistle shall not exceed 10 seconds and short blasts of the whistle shall not exceed 3 seconds. Where a lock is not provided with a sound or visual signal installation, the lockmaster will indicate by voice or by the wave of a hand when the vessel may enter or leave the lock. Vessels must approach the locks with caution and shall not enter nor leave the lock until signaled to do so by the lockmaster. The following lockage signals are prescribed:

(1) Sound signals by means of a whistle. These signals apply at either a single lock or twin locks.

(i) Vessels desiring lockage shall on approaching a lock give the following signals at a distance of not more than one mile from the lock;

(a) If a single lockage only is required: One long blast of the whistle followed by one short blast.

(b) If a double lockage is required: One long blast of the whistle followed by two short blasts.

(ii) When the lock is ready for entrance, the lock will give the following signals:

(a) One long blast of the whistle indicates permission to enter the lock chamber in the case of a single lock or to enter the landward chamber in the case of twin locks.

(b) Two long blasts of the whistle indicates permission to enter the riverward chamber in the case of twin locks.

(iii) Permission to leave the locks will be indicated by the following signals given by the lock:

(a) One short blast of the whistle indicates permission to leave the lock chamber in the case of a single lock or to leave the landward chamber in the case of twin locks.

(b) Two short blasts of the whistle indicates permission to leave the riverward chamber in the case of twin locks.

(iv) Four or more short blasts of the lock whistle delivered in rapid succession will be used as a means of attracting attention, to indicate caution, and to signal danger. This signal will be used to attract the attention of the captain and crews of vessels using or approaching the lock or navigating in its vicinity and to indicate that something unusual involving danger or requiring special caution is happening or is about to take place. When this signal is given by the lock, the captains and crews of vessels in the vicinity shall immediately become on the alert to determine the reason for the signal and shall take the necessary steps to cope with the situation.

(2) Lock signal lights. At locks where density of traffic or other local conditions make it advisable, the sound signals from the lock will be supplemented by signal lights. Flashing lights (showing a one-second flash followed by a two-second eclipse) will be located on or near each end of the land wall to control use of a single lock or of the landward lock of double locks. In addition, at double locks, interrupted flashing lights (showing a one-second flash, a one-second eclipse and a one-second flash, followed by a three-second eclipse) will be located on or near each end of the intermediate wall to control use of the riverward lock. Navigation will be governed as follows:

(i) Red light. Lock cannot be made ready immediately. Vessel shall stand clear.

(ii) Amber light. Lock is being made ready. Vessel may approach but under full control.

(iii) Green light. Lock is ready for entrance.

(iv) Green and Amber. Lock is ready for entrance but gates cannot be recessed completely. Vessel may enter under full control and with extreme caution.

(3) Radio Communications. VHF-FM radios, operating in the FCC authorized Maritime Band, have been installed at all operational locks (except those on the Kentucky River and Lock 3, Green River). Radio contact may be made by any vessel desiring passage. Commercial tows are especially requested to make contact at least one half hour before arrival in order that the pilot may be informed of current river and traffic conditions that may affect the safe passage of his tow.

(4) All locks monitor 156.8 MHz (Ch. 16) and 156.65 MHz (Ch. 13) and can work 156.65 MHz (Ch. 13) and 156.7 MHz (Ch. 14) Ch. 16 is the authorized call, reply and distress frequency, and locks are not permitted to work on this frequency except in an emergency involving the risk of immediate loss of life or property. Vessels may call and work Ch. 13, without switching but are cautioned that vessel to lock traffic must not interrupt or delay Bridge to Bridge traffic which has priority at all times.

(k) Rafts. Rafts to be locked through shall be moored in such manner as not to obstruct the entrance of the lock, and if to be locked in sections, shall be brought to the lock as directed by the lockmaster. After passing the lock the sections shall be reassembled at such distance beyond the lock as not to interfere with other vessels.

(l) Entrance to and Exit from Locks. In case two or more boats or tows are to enter for the same lockage, their order of entry shall be determined by the lockmaster. Except as directed by the lockmaster, no boat shall pass another in the lock. In no case will boats be permitted to enter or leave the locks until directed to do so by the lockmaster. The sides of all craft passing through any lock shall be free from projections of any kind which might injure the lock walls. All vessels shall be provided with suitable fenders, and shall be used to protect the lock and guide walls until it has cleared the lock and guide walls.

(m) Mooring. (1) At locks. (i) All vessels when in the locks shall be moored as directed by the lockmaster. Vessels shall be moored with bow and stern lines leading in opposite directions to prevent the vessel from "running" in the lock. All vessels will have one additional line available on the head of the tow for emergency use. The pilothouse shall be attended by qualified personnel during the entire locking procedure. When the vessel is securely moored, the pilot shall not cause movement of the propellers except in emergency or unless directed by the lockmaster. Tying to lock ladders is strictly prohibited.

(ii) Mooring of unattended or nonpropelled vessels or small craft at the upper or lower channel approaches will not be permitted within 1200 feet of the lock.

(2) Outside of locks. (i) No vessel or other craft shall regularly or permanently moor in any reach of a navigation channel. The approximate centerline of such channels are marked as the sailing line on Corps of Engineers' navigation charts. Nor shall any floating craft, except in an emergency, moor in any narrow or hazardous section of the waterway. Furthermore, all vessels or other craft are prohibited from regularly or permanently mooring in any section of navigable waterways which are congested with commercial facilities or traffic unless it is moored at facilities approved by the Secretary of the Army or his authorized representative. The limits of the congested areas shall be marked on Corps of Engineers' navigation charts. However, the District Engineer may authorize in writing exceptions to any of the above if, in his judgment, such mooring would not adversely affect navigation and anchorage.

(ii) No vessel or other craft shall be moored to railroad tracks, to riverbanks in the vicinity of railroad tracks when such mooring threatens the safety of equipment using such tracks, to telephone poles or power poles, or to bridges or similar structures used by the public.

(iii) Except in case of great emergency, no vessel or craft shall anchor over revetted banks of the river, and no floating plant other than launches and similar small craft shall land against banks protected by revetment except at regular commercial landings. In all cases, every precaution to avoid damage to the revetment works shall be exercised. The construction of log rafts along mattressed or paved banks or the tying up and landing of log rafts against such banks shall be performed in such a manner as to cause no damage to the mattress work or bank paving. Generally, mattress work extends out into the river 600 feet from the low water line.

(iv) Any vessel utilizing a federally constructed mooring facility (e.g., cells, buoys, anchor rings) at the points designated on the current issue of the Corps' navigation charts shall advise the lockmaster at the nearest lock from that point by the most expeditious means.

(n) Draft of vessels. No vessel shall attempt to enter a lock unless its draft is at least three inches less than the least depth of water over the guard sills, or over the gate sills if there be no guard sills. Information concerning controlling depth over sills can be obtained from the lockmaster at each lock or by inquiry at the office of the district engineer of the district in which the lock is located.

(o) Handling machinery. No one but employees of the United States shall move any lock machinery except as directed by the lockmaster. Tampering or meddling with the machinery or other parts of the lock is strictly forbidden.

(p) Refuse in locks. Placing or discharging refuse of any description into the lock, on lock walls or esplanade, canal or canal bank is prohibited.

(q) Damage to locks or other work. To avoid damage to plant and structures connected with the construction or repair of locks and dams, vessels passing structures in the process of construction or repair shall reduce their speed and navigate with special caution while in the vicinity of such work. The restrictions and admonitions contained in these regulations shall not affect the liability of the owners and operators of floating craft for any damage to locks or other structures caused by the operation of such craft.

(r) Trespass of lock property. Trespass on locks or dams or other United States property pertaining to the locks or dams is strictly prohibited except in those areas specifically permitted. Parties committing any injury to the locks or dams or to any part thereof will be responsible therefor. Any person committing a willful injury to any United States property will be prosecuted. No fishing will be permitted from lock walls, guide walls, or guard walls of any lock or from any dam, except in areas designated and posted by the responsible District Engineer as fishing areas. Personnel from commercial and recreational craft will be allowed on the lock structure for legitimate business reasons; e.g., crew changes, emergency phone calls, etc.

(s) Restricted areas at locks and dams. All waters immediately above and below each dam, as posted by the respective District Engineers, are hereby designated as restricted areas. No vessel or other floating craft shall enter any such restricted area at any time. The limits of the restricted areas at each dam will be determined by the responsible District Engineer and marked by signs and/or flashing red lights installed in conspicuous and appropriate places.

(t) Statistical information. (1) Masters of vessels shall furnish to the lockmaster such statistics of passengers or cargo as may be requested.

(2) The owners or masters of vessels sunk in the navigable waters of the United States shall provide the appropriate District Engineer with a copy of the sunken vessel report furnished to the U.S. Coast Guard Marine Inspection Office in accordance with Code of Federal Regulations, Title 33, Subpart 64.10-1.

(u) Operations during high water and floods in designated vulnerable areas. Vessels operating on these waters during periods when river stages exceed the level of "ordinary high water," as designated on Corps of Engineers' navigation charts, shall exercise reasonable care to minimize the effects of their bow waves and propeller washes on river banks; submerged or partially submerged structures or habitations; terrestrial growth such as trees and bushes; and man-made amenities that may be present. Vessels shall operate carefully when passing close to levees and other flood protection works, and shall observe minimum distances from banks which may be prescribed from time to time in Notices to Navigation Interests. Pilots should exercise particular care not to direct propeller wash at river banks, levees, revetments, structures or other appurtenances subject to damage from wave action.

(v) Navigation lights for use at all locks and dams except on the Kentucky River and Lock 3, Green River. (1) At locks at all fixed dams and at locks at all movable dams when the dams are up so that there is no navigable pass through the dam, the following navigation lights will be displayed during hours of darkness:

(i) Three green lights visible through an arc of 360° arranged in a vertical line on the upstream end of the river (guard) wall unless the intermediate wall extends farther upstream. In the latter case, the lights will be placed on the upstream end of the intermediate wall.

(ii) Two green lights visible through an arc of 360° arranged in a vertical line on the downstream end of the river (guard) wall unless the intermediate wall extends farther downstream. In the latter case, the lights will be placed on the downstream end of the intermediate wall.

(iii) A single red light, visible through an arc of 360° on each end (upstream and downstream) of the land (guide) wall.

(2) At movable dams when the dam has been lowered or partly lowered so that there is an unobstructed navigable pass through the dam, the navigation lights indicated in the following para-

graphs will be displayed during hours of darkness until lock walls and weir piers are awash.

(i) Three red lights visible through an arc of 360° arranged in a vertical line on the upstream end of the river (guard) wall.

(ii) Two red lights visible through an arc of 360° arranged in a vertical line on the downstream end of the river (guard) wall.

(iii) A single red light visible through an arc of 360° on each end (upstream and downstream) of the land (guide) wall.

(3) After lock walls and weir piers are awash they will be marked as prescribed in paragraph (x) of this section.

(4) If one or more bear traps or weirs are open or partially open, and may cause a set in current conditions at the upper approach to the locks, this fact will be indicated by displaying a white circular disk 5 feet in diameter, on or near the light support on the upstream end of the land (guide) wall during the hours of daylight, and will be indicated during hours of darkness by displaying a white (amber) light vertically under and 5 feet below the red light on the upstream end of the land (guide) wall.

(5) At Locks No. 1 and 2, Green River, when the locks are not in operation because of high river stages, a single red light visible through an arc of 360° will be displayed on each end (upstream and downstream) of the lock river (guard) will at which time the lights referred to above will not be visible.

(w) Navigation lights for use at locks and dams on the Kentucky River and Lock 3, Green River. A single red light visible through an arc of 360° shall be displayed during hours of darkness at each end of the river wall or extending guard structures until these structures are awash.

(x) Buoys at movable dams. (1) Whenever the river (guard) wall of the lock and any portion of the dam are awash, and until covered by a depth of water equal to the project depth, the limits of the navigable pass through the dam will be marked by buoys located at the upstream and downstream ends of the river (guard) wall, and by a single buoy over the end or ends of the portion or portions of the dam adjacent to the navigable pass over which project depth is not available. A red nun-type buoy will be used for such structures located on the left-hand side (facing downstream) of the river and a black can-type buoy for such structures located on the right-hand side. Buoys will be lighted, if practicable.

(2) Where powerhouses or other substantial structures projecting considerably above the level of the lock wall are located on the river (guard) wall, a single red light located on top of one of these structures may be used instead of river wall buoys prescribed above until these structures are awash, after which they will be marked by a buoy of appropriate type and color (red nun or black can buoy) until covered by a depth of water equal to the project depth. Buoys will be lighted, if practicable.

(y) Vessels to carry regulations. A copy of these regulations shall be kept at all times on board each vessel regularly engaged in navigating the rivers to which these regulations apply. Copies may be obtained from any lock office or District Engineer's office on request. Masters of such vessels are encouraged to have on board copies of the current edition of appropriate navigation charts.

Notes

1. Muskingum River Lock & Dam 1 has been removed. Ohio River slackwater provides navigable channel for recreational craft to Lock 2 near Devola, Ohio. Muskingum River Locks 2 thru 11 inclusive have been transferred to the State of Ohio and are operated during the recreational boating season by the Ohio Department of Natural Resources. Inquiries regarding Muskingum River channel conditions and lock availability should be directed to the aforementioned Department.

2. Little Kanawha River Lock and Dam 1 has been removed, thus permitting recreational craft to navigate up to Lock 2 near Slate, W. Va. Operation of Locks 2 thru 5 on the Little Kanawha River has been discontinued.

3. Big Sandy River: Lock 1 has been removed, thus permitting recreational craft to navigate to Lock 2, near Buchanan, Ky. Operation of Lock 2 and Lock 3 near Fort Gay, W. Va. has been discontinued. Operation of Lock and Dam 1 on Levisa Fork near Gallup, Ky., and Lock and Dam 1 on Tug Fork near Chapman, Ky. has been discontinued.

4. Operation of the following Green River Locks has been discontinued: Lock 4 near Woodbury, Ky., Lock 5 near Glenmore, Ky., and Lock 6 near Brownsville, Ky.

5. Operation of Barren River Lock and Dam No. 1 near Richardsville, Ky. has been discontinued.

6. Operation of Rough River Lock and Dam No. 1 near Hartford, Ky. has been discontinued.

7. Operation of Osage River Lock and Dam 1 near Osage City, Mo., has been discontinued.

8. Operation of the 34 locks in the Illinois and Mississippi (Hennepin) Canal, including the feeder section, has been discontinued.

9. Operation of the Illinois and Michigan Canal has been discontinued.

§207.390 The Great Lakes; waterborne commerce statistics.

(a) Owners, agents, masters, and clerks of vessels and other craft plying the Great Lakes and individuals and corporations engaging in transporting their goods upon the Great Lakes, shall hereafter furnish statements relative to vessels, passengers, freight, and tonnage in the manner and at such times as prescribed in this section.

(1) Vessels operated on the Great Lakes are classified according to the nature of their operations, and movements of those in each class will be reported upon on forms furnished by the Corps of Engineers, Department of the Army, as follows:

(i) Class 1. Vessels operating as contract or private carriers, or combinations of these, except those engaged in fishing, sand and gravel dredging, railroad car ferrying, general and automobile ferrying, and common carrier package freighting and/or passenger carrying, shall be reported, upon or shortly after their arrival at any port or locality, whether carrying cargoes or moving light or in ballast. Each movement will be numbered beginning with No. 1 in each calendar year.

(a) Traffic Form 1 (post card) will be used when a vessel of Class 1 moves from one port or locality to another port or locality, and carries but one commodity, or is light or ballasted.

(b) Traffic Form 2 (sheet form) will be used when a vessel of Class 1 loads a unit or mixed cargo at several ports or localities, and discharges the same at one or more ports or localities. Reports must be made so that the movement of each commodity between ports can be traced. These reports will be mailed in the envelopes provided therefor.

(ii) Class 2. This includes vessels operating as common carriers in regularly established freight and/or passenger traffic between specified ports. Reports will be made on Traffic Form 3, monthly or at other periods, as per arrangements made with the U.S. District Engineer office in whose district the operating headquarters of the transportation line making such report is located.

(iii) Class 3. This includes vessels engaged in fishing on the Great Lakes or tributary waters, the dredging and the movement of sand and gravel, railroad car ferrying, and general and automobile ferrying. Reports on the movements and business done by this class of carrier will be made as required by the several District Engineer offices on the Great Lakes.

(b) In case any owner or operator of a vessel or vessels has not been contacted with respect to reporting his activities, any one of the Engineer offices listed below should be notified:

Buffalo, N.Y.
Detroit, Mich.
St. Paul, Minn.
Chicago, Ill.

or The Division Engineer, U.S. Army Engineer Division, North Central, 536 South Clark Street, Chicago 5, Illinois.

§207.420 Chicago River, Ill.; Sanitary District controlling works, and the use, administration, and navigation of the lock at the mouth of river, Chicago Harbor.

(a) Controlling works. The controlling works shall be so operated that the water level in the Chicago River will be maintained at a level lower than that of the lake, except in times of excessive storm run-off into the river or when the level of the lake is below minus 2 feet, Chicago City Datum.

(1) The elevation to be maintained in the Chicago River at the west end of the lock will be determined from time to time by the U.S. District Engineer, Chicago, Illinois. It shall at no time be higher than minus 0.5 foot, Chicago City Datum, and at no time lower than minus 2.0 feet, Chicago City Datum, except as noted in the preceding paragraph.

(b) Lock–(1) Operation. The lock shall be operated by the Metropolitan Sanitary District of Chicago under the general supervision of the U.S. District Engineer, Chicago, Illinois. The lock gates shall be kept in the closed position at all times except for the passage of navigation.

(2) Description of lock.

Clear length-600 feet.
Clear width-80 feet.
Depth over sills-24.4 feet (Note 1).

Note 1.–This depth is below Chicago City Datum which is the zero of the gages mounted on the lock. The clear depth below Low Water Datum for Lake Michigan, which is the plane of reference for National Ocean Survey charts, is 23.0 feet.

The east end of the northeast guide wall shall be marked by an intermittent red light, and by a traffic light showing a fixed red or fixed green light. The west end of the northwest gate block shall be marked by a traffic light showing a fixed red or fixed green light. The east end of the southeast guide wall and the west end of the southwest guide wall shall be marked by an intermittent white light.

(3) Authority of lockmasters. The lockmaster shall be charged with the immediate control and management of the lock, and of the area set aside as the lock area, including the lock approach channels. He shall see that all laws, rules and regulations for the use of the lock and lock area are duly complied with, to which end he is authorized to give all necessary orders and directions in accordance therewith, both to employees of the Government and to any and every person within the limits of the lock or lock area, whether navigating the lock or not. No one shall cause any movement of any vessel, boat, or other floating thing in the lock or approaches except by or under the direction of the lockmaster or his assistants.

(4) Signals. (i) Signals from vessels for lockage shall be by whistle, horn or by idling or standing near the ends of the lock guide walls. Signals from the lockmaster shall be by the traffic light and horn and/or by voice with or without electrical amplification. In case of emergency, the lockmaster may signal the vessel by wave of hand or lantern, and the signals thus given shall have the same weight as though given by visual or sound devices at the lock. Vessels must approach the lock with caution and shall not enter or leave the lock until signaled to do so by the lockmaster. The following lockage signals and duration of sound signals are prescribed. A long blast shall be of 4 second duration; a short blast shall be of 1 second duration.

(a) Vessel signals. Inbound vessels at a distance of not more than 4,000 feet from the lock and outbound vessels immediately after crossing under the Lake Shore Drive bridge shall signal for lockage by 2 long and 2 short blasts of a whistle or horn.

(b) Lock signals. (1) When the lock is ready for entrance, the traffic light will show green, and vessels under 500 gross tons shall come ahead under caution and enter the lock; vessels of 500 gross tons or more shall come to a stop along the guide wall, as prescribed in paragraph 5. Should the traffic light be out of order or be invisible due to thick weather, vessels shall upon 1 long blast of the lock horn approach and moor to the south guide wall or continue into the lock if so directed by the lockmaster.

(2) When the lock is not ready for entrance, the traffic light will show red, and vessels shall not pass beyond the end of the south guide wall: Provided, however, That vessels may approach and moor to said wall if authorized by 1 long blast of the lock horn.

(3) Permission to leave the lock shall be indicated by 1 short blast of the lock horn.

(4) Caution or danger will be indicated by 4 or more flashes of the red traffic light or 4 or more short blasts of the lock horn delivered in rapid succession.

(ii) When in the lock, vessels shall not blow whistle signals for tugs, bridges, landings, etc., without the lockmaster's permission.

(iii) The master and chief engineer of each vessel of 500 gross tons or more shall be on duty at their respective stations when passing through the lock.

(5) Stop before entering. All vessels or tows of 500 gross tons or more shall come to a full stop at the point indicated by the sign reading "Stop" on the south guide wall and shall not proceed into the lock until so directed by the lockmaster.

(6) Maximum draft. Vessels drawing within 6 inches of the depth over the sills shall not be permitted lockage except under special permission from the lockmaster.

(7) Precedence at locks. The vessel arriving first at a lock shall be first to lock through; but precedence shall be given to vessels belonging to the United States and to commercial vessels in the order named. Arrival posts or markers may be established ashore above or below the locks. Vessels arriving at or opposite such posts or markers will be considered as having arrived at the locks within the meaning of this paragraph.

(8) Lockage of pleasure boats. The lockage of pleasure boats, house boats or like craft shall be expedited by locking them through with commercial craft (other than barges carrying petroleum products or highly hazardous materials) in order to utilize the capacity of the lock to its maximum. If, after the arrival of such craft, no separate or combined lockage can be accomplished within a reasonable time, not to exceed the time required for three other lockages, then separate lockage shall be made.

(9) Speed of approach and departure. Vessels of 500 gross tons or more when approaching the lock shall navigate at a speed not exceeding 2 miles per hour, and when leaving the lock shall navigate at a speed not exceeding 6 miles per hour. While entering or leaving the lock, the propellers of vessels of 500 gross tons or more shall be operated at slow speed so as not to undermine or injure the concrete paving on the bottom of the lock chamber. Tugs assisting vessels in lockage, and Coast Guard and fire vessels, may navigate at a higher speed when authorized by the lockmaster. Vessels of less than 500 gross tons shall operate at reasonable speed.

(10) Mooring. (i) Vessels shall be moored in the lock or along its approach walls in such a manner as may be directed by the lockmaster. Tying to lock ladders, lamp standards, or railings is strictly prohibited. Commercial vessels and tows of 500 gross tons or more shall, in general, have at least one line out when entering the lock and shall be moored in the lock with two bow and two stern lines, which shall lead forward and aft at each end of the vessel or tow. When the gates are closed, commercial vessels shall not be permitted to work their wheels. Said vessels shall have at least two seamen ashore to handle the mooring lines while they are in the lock.

(ii) Mooring lines shall not be cast off until after the lock gates have been opened fully into their recesses, and the signal given to leave the lock. The lines leading aft shall be released first. The lines leading forward shall not be released until the vessel has started to move forward, so as to prevent the vessel from drifting back into the lock gates.

(11) (Revoked)

(12) Unnecessary delay at lock. Masters and pilots must use every precaution to prevent unnecessary delay in entering or leaving the lock. Vessels failing to enter lock with reasonable promptness, when signaled to do so, shall lose their turn. Vessels arriving at the lock with their tows in such shape so as to impede lockage, shall lose their turn.

(13) Depositing refuse prohibited. The depositing of ashes or refuse matter of any kind in the lock; the passing of coal from barges or flats while in the lock; and the emission of dense smoke from any vessel while passing through the lock, is forbidden.

(14) Vessels denied lockage. The lockmaster may deny the privilege of passage through the lock to any vessel with sharp or rough projecting surfaces of any kind, or overhanging rigging, or any vessel which is badly leaking or in a sinking condition.

(15) Fenders. All barges and oil tankers must be provided with suitable nonmetallic fenders so as to eliminate damage to the lock or approach walls and reduce fire hazard. Said fenders shall be used as may be directed by the lockmaster.

(16) Operating machinery. Lock employees only shall be permitted to operate the lock gates, valves, signals or other appliances. Tampering or meddling with machinery or other parts of the lock is strictly forbidden.

(17) Commercial statistics. Upon each passage through the lock the master or member of the crew of each vessel shall furnish the lockmaster such statistical information as may be required.

(18) Vessels to carry regulations. A copy of the regulations in this section shall be kept at all times on board each vessel regularly engaged in navigating this lock. Copies may be obtained without charge from the lockmaster.

(19) Failure to comply with regulations. Any vessel failing to comply with this section or any orders given in pursuance thereof, may in the discretion of the lockmaster be denied the privilege of passage through or other use of the lock or appurtenant structures.

§207.425 Calumet River, Ill.; Thomas J. O'Brien

Lock and Controlling Works and the use, administration, and navigation of the lock.

(a) Controlling Works. (1) The controlling works shall be so operated that the water level at the downstream end of the lock will be maintained at a level lower than that of Lake Michigan, except in times of excessive storm runoff into the Illinois Waterway, or when the lake level is below minus 2 feet, Chicago City Datum.

(2) The elevation to be maintained at the downstream end of the lock shall at no time be higher than minus 0.5 feet, Chicago City Datum, and at no time lower than minus 2.0 feet, Chicago City Datum, except as noted in paragraph (a)(1) of this section.

(b) Lock–(1) Operation. The Thomas J. O'Brien Lock and Dam is part of the Illinois Waterway which is a tributary of the Mississippi River. All rules and regulations defined in 207.300, Ohio River, Mississippi River above Cairo, Ill., and their tributaries; use, administration, and navigation shall apply.

§207.440 St. Marys Falls Canal and Locks, Mich.; use, administration, and navigation.

(a) The use, administration, and navigation of the canal and canal grounds shall be under the direction of the District Engineer, Engineer Department at Large, in charge of the locality, and his authorized agents. The term "canal" shall include all of the natural waters of the St. Marys River on the United States side of the International Boundary and all of the canalized waterway and the locks therein between the western or upstream limit, which is a north and south line tangent to the west end of the Northwest Pier, and the eastern or downstream limit, which is a north and south line tangent to the northeast corner of the old Fort Brady Reservation, the distance between limits being 1.9 miles. The term "canal grounds" shall include all of the United States part and other lands, piers, buildings, water level regulation works, hydroelectric power plant, and other appurtenances acquired or constructed for the channel improvement and use of the waterway.

Note.–Rules and regulations governing the movements of vessels and rafts in St. Marys River from Point Iroquois, on Lake Superior, to Point Detour, on Lake Huron, prescribed by the United States Coast Guard pursuant to 33 U.S.C. 475, are contained in 33 CFR 92.

(b) Masters of all registered vessels approaching and desiring to use the locks shall, upon arriving at Sailors Encampment, Little Rapids Cut, and Brush Point, report the name of the vessel and its draft to the Coast Guard Lookout Stations at those points.

Note.–The Coast Guard lookout stations have been disestablished; instead call Soo Control.

(c) Upon approaching the canal, vessel masters shall request lock dispatch by radiotelephone to the Corps of Engineers Chief Lockmaster at St. Mary's Falls Canal dispatch tower (Radio Call WUD-31). Every upbound vessel shall call when abeam of Bayfield Rock Pile Dike which is approximately one and one-eighth miles downstream from East Center Pier end. Every downbound vessel shall call when approximately one-half mile downstream from Big Point.

(d) When in the locks, vessels shall not blow whistle signals for tugs, supply vessels, or persons unless authorized to do so by the District Engineer or his authorized agents.

(e) On all vessels of 400 gross tons or over navigating the canal under their own power, there shall be on duty the following ship's officers: In the pilot house, on the bridge, or in the immediate vicinity thereof, the master, one mate, and one wheelsman; in the engine room, the chief engineer, one assistant engineer, and one oiler or other member of the crew familiar with the operation of the engine. During transit of the locks, all vessels of 400 gross tons or over equipped with power operated mooring deck winches shall have, in addition to the winch operators, mates or signalmen at the forward and after ends of the vessel to direct operations from points providing maximum vision of both the winch operators and canal linesmen.

(f) Within the limits of the canal, vessels approaching the locks shall not navigate at a speed greater than 2½ miles per hour, and vessels leaving the locks shall not navigate at a speed greater than 6 miles per hour. Tugs assisting vessels in passing the locks may be authorized by the District Engineer or his authorized agents to navigate at a higher speed when considered necessary to expedite canal operations.

(g) For passage through the canal, vessels or boats owned or operated by the United States Government may be given precedence over all others.

(h) All registered vessels will be passed through the locks in the order of their arrival at the canal, unless otherwise directed by the District Engineer or his authorized agents. When a vessel that has stopped on its own business is ready to proceed, it is not entitled to precedence over other vessels already dispatched even though it may have preceded such vessels in arriving at any coast Guard Lookout Station. Unregistered craft must have a special permit for separate lockage.

(i) Unless otherwise directed, all vessels or boats approaching the locks shall stop at the points indicated by signs placed on the canal piers until ordered by the District Engineer or his authorized agents to proceed into the lock.

(j) Vessels and boats shall not proceed to enter or leave a lock until the lock gates are fully in their recesses and the lockmaster has given directions for starting.

(k) Upon each passage through the canal, the master or clerk of the vessel or craft shall report to the canal office, upon the prescribed form, a statement of passengers, freight, and registered tonnage, and such other statistical information as may be required by the blank forms provided for the purpose.

(l) No business, trading, or loading or landing of freight, baggage, or passengers will be allowed on or over the canal piers or lock walls, or over the other piers within the limits of the canal grounds, except by prior authority of the District Engineer or his authorized agents.

(m) No person shall throw material of any kind into the canal, or litter the grounds with any refuse.

(n) The releasing of vessel steam, water, or waste from side discharge openings upon the piers or lock walls, the cleaning of boiler flues in the locks or canal, or the emission of dense smoke from the stack of any vessel while passing through the locks, is forbidden.

(o) No person shall enter or navigate the canal with a boat or other craft which, when entering or while navigating the canal, shall have an iron or irons projecting from it or a rough surface or surfaces on it which would be liable to damage the lock walls or canal piers.

(p) No person shall cause or permit any vessel or boat of which he is in charge or on which he is employed to in any way obstruct the canal or delay in passing through it, except upon prior authority of the District Engineer or his authorized agents.

(q) No person shall enter upon any part of the canal grounds except as permitted, either generally or in specific instances, by the District Engineer or his authorized agents. No person shall willfully or carelessly injure, tamper with, or damage the canal or any of the Government buildings, works or structures, trees or shrubbery, or other public property pertaining to the canal or canal grounds.

(r) All barges or other vessels navigating within the canal and not operated under their own power, whether approaching or leaving the locks, are required to be assisted by one or more tugs of sufficient power to insure full control at all times.

(s) Smoking and open flames are prohibited on the canal grounds within 50 feet of any tanker transiting the canal and locks, and on board the tanker transiting the locks except in such places as may be designated in the ship's regulations.

(t) All oil tankers, barges, and other vessels which are used for transporting inflammable liquids, either with or without cargo, shall, if not equipped with fixed timber fenders, be prevented from contacting any unfendered pier, lock wall, or other structure by an adequate number of suitable fenders of timber, rubber, or rope placed between the vessel and such unfendered structure.

(u) The locks will be opened and closed to navigation each year as provided in paragraph (u) (1) and (2) of this section except as may be authorized by the Division Engineer. Consideration will be given to change in these dates in an emergency involving disaster to a vessel or other extraordinary circumstances. However, if requested by the using interests on or before November 1, the closing date may be extended to meet reasonable demands of commerce to the extent that weather and ice conditions permit.

(1) Opening date. At least one lock will be placed in operation for the passage of vessels on April 1. Thereafter, additional locks will be placed in operation as traffic density demands.

(2) Closing date. The locks will be maintained in operation only for the passage of downbound vessels departing from a Lake Superior Port before midnight of December 14, and of upbound vessels passing Detour before midnight of December 15. Vessel owners are requested to report in advance to the Engineer in charge at Sault Ste. Marie, the name of vessel and time of departure from a Lake Superior Port on December 14, before midnight, and of vessels passing Detour on December 15 before midnight, which may necessitate the continued operation of a lock to permit passage of vessel.

(v) The maximum overall dimensions of vessels that will be permitted to transit MacArthur Lock are 730 feet in length and 75 feet in width, except as provided in paragraph (v)(1) of this section. Further, any vessel of greater length than 600 feet must be equipped with deck winches adequate to safely control the vessel in the lock under all conditions including that of power failure.

(1) Whenever the Poe Lock is out of service for a period exceeding 24 hours the District Engineer may allow vessels greater than 730 feet in length, but not exceeding 767 feet in length to navigate the MacArthur Lock. Masters of vessels exceeding 730 feet in length shall be required to adhere to special handling procedures as prescribed by the District Engineer.

(w) The maximum overall dimensions of vessels that will be permitted to transit the New Poe Lock without special restrictions are 100 feet in width, including fendering, and 1,000 feet in length, including steering poles or other projections. Vessels having overall widths of over 100 feet and not over 105 feet including fendering, and overall lengths of not more than 1,100 feet, including projections, will be permitted to transit the New Poe Lock at such times as determined by the District Engineer or his authorized representative that they will not unduly delay the transit of vessels of lesser dimensions or endanger the lock structure because of wind, ice, or other adverse conditions. These vessels also will be subject to such special handling requirements as may be found necessary by the Area Engineer at time of transit. Vessels over 1,000 feet in length will be required to be equipped with six mooring cables and winches ready for use to assist in safe transit of the lock.

(x) Masters or other persons refusing to comply with the regulations in this section or any orders given in pursuance thereof, or using profane, indecent, or abusive language, may, in the discretion of the District Engineer or his authorized agents, be denied the privileges of the locks and canal grounds.

§207.441 St. Marys Falls Canal and Locks, Mich.; security.

(a) Purpose and scope of the regulations. The regulations in this section are prescribed as protective measures. They supplement the general regulations contained in §207.440 the provisions of which shall remain in full force and effect except as modified by this section.

(b) Restrictions on transit of vessels. The following classes of vessels will not be permitted to transit the United States locks or enter any of the United States approach canals:

(1) (Reserved)

(2) (Reserved)

(3) (Reserved)

(4) All oil tankers having draft and beam permitting transit through the Canadian lock; those having too great a draft or beam to transit the Canadian lock may continue to use the United States locks. Tankers using the United States locks will not be transited through the MacArthur Lock unless their drafts make it necessary. All tanker transits shall be in single lockages. While in the lock area, smoking by personnel aboard tankers is prohibited in any part of the vessel regardless of locations.

(5) All vessels carrying explosives.

(c) Personnel restrictions. Masters of vessels are responsible for the conduct of crew and passengers while transiting St. Marys Falls Canal and Locks and for strict compliance with the regulations. The following procedures are established for the control of persons embarking or debarking from vessels while transiting the locks:

(1) The master or mate and not more than three deckhands will be permitted to go ashore from transiting vessels and then only for normal operations and business incident to the transit. A maximum of four men will be permitted ashore at any one time from any one ship.

(2) Personnel–(i) Embarking. Personnel, including technicians, repairmen, and company officials will be permitted to embark at the locks if they are in possession of a letter addressed to the Area Engineer, St. Marys Falls Canal, Sault Ste. Marie, Michigan, from the vessel's master, the operators of the vessel, or the Lake Carriers' Association, requesting that the individual named therein be permitted to embark on a particular vessel. United States vessel personnel must also be in possession of a specially validated seaman's document issued by the United States Coast Guard. Their papers will be presented to the civilian guard on duty at the main gate on Portage Avenue who will arrange escort from the gate to the vessel. Luggage will be subject to inspection.

(ii) Debarking. The vessel master will furnish prior notification to the Chief Lockmaster at St. Marys Falls Canal Tower (Radio Call WUD-31) that he has vessel personnel, technicians, repairmen or company officials aboard for whom he requests authority to debark. If authority to debark is granted such personnel will be furnished a letter by the vessel master, addressed to the Area Engineer, St. Marys Falls Canal, Sault Ste. Marie, Michigan, giving the name and position of the individual concerned. Personnel will not debark until they have been properly identified by a licensed officer of the vessel and the letter furnished to the escort provided from the civilian guard detail who will escort personnel to the gate. In the event a person debarking for medical attention is a litter case, notification will be given sufficiently in advance to permit the Chief Lockmaster to route the vessel to the MacArthur Lock in order that the long carry over the lock gates may be avoided. The Area Engineer will make the necessary arrangements for clearance of ambulances and medical personnel into the lock area.

(3) No passengers or guest passengers will be permitted to embark or debark at St. Marys Falls Canal except in emergency when medical attention is required.

(4) Letters cited in paragraph (c)(2) of this section are valid only for a single passage through the lock area. In the event frequent access to the area is required a request for extended access with reasons therefor will be submitted to the Area Engineer, St. Marys Falls Canal, Sault Ste. Marie, Michigan, who may arrange for the necessary clearance.

(5) Emergency needs to embark or debark which develop with insufficient time to follow the procedure outlined in this paragraph will be approved or disapproved by the Area Engineer, St. Marys Falls Canal, Sault Ste. Marie, Michigan, according to the circumstances of the individual case, and requests therefor should be promptly directed to him.

§207.460 Fox River, Wis.

(a) Use, Administration, and Navigation of the Locks and Canals. (1) Navigation. The Fox River and Wolf River navigation seasons will commence and close as determined by the district engineer, Corps of Engineers, in charge of the locality, depending on conditions and need for lock service. Days and hours of lock operation will also be determined by the district engineer. Public notices will be issued announcing or revising the opening and closing dates and operating schedules at least 10 days in advance of such dates.

(2) Authority of lockmaster. The movement of all boats, vessels, tows, rafts and floating things, both powered and nonpowered, in the canals and locks, approaches to the canals, and at or near the dams, shall be subject to the direction of the lockmaster or his duly authorized representatives in charge at the locks.

(3) Signals. All boats approaching the locks shall signal for lockage by four distinct whistles of short duration. Locks will not be opened on such audible signal during the period when advance notice is required if the services of the lock tender are required elsewhere to meet prior requests for lockages.

(4) Mooring in locks. All craft being locked shall be secured to the mooring posts on the lock walls. Large craft shall use one head line and at least one spring line. Lines shall remain fastened until the signal is given by the lock tender for the craft to leave the lock.

(5) Delays in canals. No boat, barge, raft or other floating craft shall tie up or in any way obstruct the canals or approaches, or delay entering or leaving the locks, except by permission from proper authority. Boats wishing to tie up for some hours or days in the canals must notify the Project Engineer directly or through a lock tender, and proper orders on the

case will be given. Boats so using the canals must be securely moored in the places assigned, and if not removed promptly on due notice, will be removed, as directed by the Project Engineer at the owner's expense. Boats desiring to tie up in the canals for the purpose of unloading cargoes over the canal banks must, in each case, obtain permission in advance from the District Engineer. Request for such permission shall be submitted through the Project Engineer.

(6) Provisions for lockage service.

(i) Commercial vessels, barges, rafts and tows engaged in commerce will be provided lockages during the same period as provided for pleasure boats (see paragraph (a)(6)(iv) of this section).

(ii) Pleasure boats, powered and nonpowered, houseboats and similar craft will be provided with not more than one lockage each way through the same lock in a 24-hour period.

(iii) All small vessels or craft, such as skiffs, sculls, sailing boats, etc., shall be passed through locks in groups of not less than six at one lockage, or may be granted separate lockage if the traffic load at the time permits.

(iv) Lockage may be provided during certain hours other than announced at the intermediate locks provided prior requests are made to the Corps of Engineers, Fox River Project Office. Requests may be made either in writing, by telephone or in person to U.S. Army Corps of Engineers, Fox River Project Office, 1008 Augustine Street, Kaukauna, Wisconsin 54130, telephone: 414-766-3531.

(7) Injury to locks or fixtures. Vessel operators shall use great care not to strike any part of the locks or sluice walls, or any gate or appurtenance thereto, or machinery for operating the gates, or the walls protecting the banks of the canals. All boats using the canals shall be free from projecting irons or rough surfaces that would be liable to damage the locks or any part of the canals, and they must be provided with fenders to be used in guarding the lock walls, etc., from injury. Boats will not be permitted to enter or leave the locks until the lock gates are fully in the gate recesses, and the lock tender has directed the boat to proceed. No vessel shall be raced or crowded alongside another vessel, or be moved at such speed as will cause excessive swells or wash. Speed shall be kept at a minimum consistent with safe navigation.

(8) Handling gates. No one, unless authorized by the lock tender, shall open or close any gate, or valve, or in any way interfere with the employees in the discharge of their duties. The lock tender may call for assistance from the master of any boat using the lock should such aid be needed.

(9) Draft of boats. No boat shall enter a canal or lock whose actual draft exceeds the least depth of water in the channel of the canal as given by the Project Engineer.

(10) Right-of-way. Boats going downstream shall have the right-of-way over boats going upstream. Ordinarily, the boats or tows arriving first at any of the locks shall have precedence in passage except that those vessels which have given advance notice, when such notice is required, shall have precedence over other vessels when such notifying vessel is ready for passage. In all cases boats and barges belonging to the United States, or employed upon public works, shall have precedence over all others, and commercial passenger boats shall have precedence over tows. All boats not taking advantage of the first lawful opportunity to pass shall lose their turn. When lockage has started on tows requiring multiple lockages, all units of the tow will be locked ahead of other vessels traveling in the same direction. In the case of tows requiring two lockages, any craft awaiting lockage in the opposite direction will have priority over the second lockage of the tow.

(11) Boats and rafts without power. No boat or raft without power except small boats controlled by sails or oars shall be brought through the canal unless accompanied by a power operated boat.

(12) Dumping of refuse in waterway. No refuse or other material shall be thrown or dumped from vessels into the natural river, improved channels, canals and locks or placed on any bank of the river or berm of the canals so that it is liable to be thrown or washed into the waterway. (Section 13 of the River and Harbor Act of March 3, 1899 (30 Stat. 1152; 33 U.S.C. 407) prohibits the depositing of any refuse matter in any navigable water or along the banks thereof where the same shall be liable to be washed into such navigable water.)

(13) Drawing off water. No water shall be drawn by any party or parties from any portion of the Fox River canals, or of the Fox River, including its lakes, improved channels, and unimproved channels, to such extent as to lower the water surface below the crest of that dam next below the place where such draft of water is affected.

(14) Obstructing navigation. Anyone who shall willfully or through carelessness in any way obstruct the free navigation of the waterway, or by violation of any of the laws or regulations governing the waterway and those using it, delay or inconvenience any boat having the right to use the waterway, shall be responsible for all damages and delays, and for all expenses for removing the obstructions. (Section 20 of the River and Harbor Act of March 3, 1899 (30 Stat. 1154; 33 U.S.C. 415), authorizes the immediate removal or destruction of any sunken vessel, craft, or similar obstruction, which impedes or endangers navigation.)

(15) Commercial statistics. (i) As required by section 11 of the River and Harbor Act of September 22, 1922 (42 Stat. 1043; 33 U.S.C. 555), owners, agents, masters, or clerks of vessels plying the waterway shall submit a report on such activities for statistical purposes which shall contain the following information:

Name of vessel.

Name and address of owner or operator.

Type of vessel-steam, motor, sail, barge, or other type.

Number of passengers.

Net registered tonnage-if not registered, approximate net tonnage.

Maximum draft at time of passage.

Cargo-by commodities, expressed in tons, or other units by which such commodities are customarily measured, giving origin and destination.

(ii) The report shall be mailed promptly to the District Engineer, Chicago District, Corps of Engineers, Attn: Construction-Operations Division-Statistics, 219 South Dearborn Street, Chicago, Ill. 60604, on forms furnished free of charge by that office. On written request, persons or corporations making frequent use of the waterway may be granted permission to submit monthly statements in lieu of reports by trips.

(16) Trespass on United States property. Trespass on waterway property or injury to the banks, locks, dams, canals, piers, fences, trees, buildings, or any other property of the United States pertaining to the waterway is strictly prohibited. No business, trading or landing of freight or baggage will be allowed on or over Government property, unless a permit or lease approved by the Secretary of the Army has been secured.

(17) Neenah dam outlet works. (i) During periods of high water, when determined to be necessary by the District Engineer, U.S. Army Engineer District, Chicago, to reduce the threat of flooding, it shall be the duty of the person owning, operating, or controlling the dam across the Neenah Channel of the Fox River at Neenah, Wis., acting as agent of the United States, to open or close, or cause to be opened or closed, pursuant to paragraph (a) (17)(ii) of this section, the outlet works of said dam to regulate the passage of water through said outlet works.

(ii) The outlet works of said dam shall be opened when and to the extent directed by the District Engineer or his authorized field representatives, and said outlet works shall thereafter be closed when and to the extent directed by the said District Engineer or his authorized field representative.

(b) Use of the United States drydock on Fox River at Kaukauna, Wis. (1) The drydock being a part of the Fox River improvement, its use will be governed by the general regulations for the use, administration, and navigation of that river, so far as they may be applicable.

(2) The drydock at Kaukauna, when not required for repairs or construction by the United States, may be used by private parties or corporations under certain restrictions and under the supervision and direction of the United States District Engineer in charge of the locality or his authorized agent.

(3) The drydock will be loaned to private parties only when no private drydock is available at the time and for the purpose desired. Applicants will be required to establish over their signature the fact that due effort has been made to secure the use of a private drydock and none can be had.

(4) Private parties desiring to use the Kaukauna drydock will give notice to the United States Assistant Engineer in local charge at Appleton, Wis., as long in advance as practicable, stating when use of the dock is wanted, nature of repairs required, and the dimensions and character of boat. No boat will enter the dock until the permission of the United States District Engineer or the Assistant Engineer above referred to has been obtained.

(5) All private parties or corporations using the Kaukauna drydock will furnish all material and labor, including blocking, when necessary, required for prompt execution of their work, and will also furnish all labor for properly operating, under the immediate personal supervision of an authorized canal employee, gates, and sluices of the drydock. No gate or sluice of the drydock will be operated, or in any way meddled with, except by permission of and under the personal supervision of such authorized canal employee.

(6) No boat will be allowed to occupy the Kaukauna drydock for a longer period than 2 days when other boats are waiting to use the dock, except in cases when, in the opinion of the United States District Engineer or his authorized agent, circumstances necessitate and justify a longer use than 2 days. The United States District Engineer or his authorized agent is authorized to remove from the drydock any boat using or occupying such dock without his authority, and the expense of such removal will be paid by the party or parties owning such boat.

(7) The wages of all mechanics and laborers, due from private parties for repairs carried on in the Kaukauna drydock, must be paid before the boat leaves the dock.

(8) Repair shop, timber shed, tools, etc., owned by the Government at and near the drydock shall not be used by parties allowed to occupy the drydock.

(9) Lumber and all material needed by parties allowed to use the drydock may be deposited in the drydock yards at such places as may be directed, but only for such time as repairs are being made, and residue must be entirely removed when the boat leaves the dock; general storage will not be permitted.

(10) All refuse and old material taken from boats under repairs must be removed or disposed of, as may be directed, by the owner of the boat or his employees without expense to the Government, and before the boat leaves the dock, and to the satisfaction of the agent in charge of the dock.

(11) The Government charges for the authorized and necessary use and occupancy of the Kaukauna drydock by private boats shall be, until further orders, as follows:

(i) Docking charges (including lay time for the calendar day on which vessel is docked): Tugs, motor boats, and dredges, 75 cents per linear foot; $25 minimum charge. Barges, dump scows, and derrick boats, 65 cents per linear foot; $20 minimum charge.

(ii) Lay-day charges (excluding Sundays and national holidays, unless repairs are made on such Sundays and holidays): For all vessels, 20 cents per linear foot per calendar day or part thereof; $7 per calendar day or part thereof, minimum charge.

(12) The charges for all use or occupancy of the Kaukauna drydock by a boat or private parties, after repairs on such boat have, in the opinion of the United States District Engineer or authorized agent, been so far completed as to permit safe removal from the dock, or after such removal has been ordered by the United States District Engineer or his authorized agent, shall be $50 per day or part of a day, in addition to any penalties incurred for violation of any of the regulations prescribed by law for the government of the dock and those using it.

(13) The dock will be considered in use by a boat from the time the dock is placed at its disposal until the boat is out of the dock.

(14) The length of all vessels shall be the over-all length measured on the main deck from stem to stern.

(15) The charges for the use of the drydock shall be paid within 10 days from date of bill, which will be submitted to the owner by the District Engineer as promptly as possible after the vessel leaves the dock. If charges are not so paid, the vessel shall be liable to the amount of the charges and the cost of collection in the manner prescribed by law, and the owner of the vessel shall be denied the use of the drydock until all charges and the cost of collection have been paid to the United States.

(16) This section supersedes the regulations for the use of this drydock approved April 10, 1906, which regulations are hereby revoked.

§207.470 Sturgeon Bay and Lake Michigan Ship Canal, Wis., use and navigation.

(a) Authority of canal officers. The movement of all boats and floating things in the canal and in the approaches thereto shall be under the direction of the superintendent or his authorized assistants, and their orders and instructions must be obeyed.

(b) Signals. On entering the canal at either entrance, steamers or tugs must blow their whistles for 1 minute in order to warn craft approaching from opposite direction and give them time to guard against collisions, by tying up if necessary. All steamers approaching others going in the opposite direction shall slacken speed so as to pass in safety. Compliance is required with rule V of the rules and regulations for government of pilots, adopted by the United States Coast Guard.

Rule V. Whenever a steamer is nearing a short bend or curve in the channel where, from the height of the banks or other cause, a steamer approaching from the opposite direction cannot be seen for a distance of half a mile, the pilot of such steamer, when he shall have arrived within half a mile of such curve or bend, shall give a signal by one long blast of the steam whistle, which signal shall be answered by a similar blast by the pilot of any approaching steamer that may be within hearing. Should such signal be so answered by a steamer upon the farther side of such bend, then the usual signals for the meeting and passing shall immediately be given and answered; but if the first alarm signal of such pilot be not answered, he is to consider the channel clear and govern himself accordingly.

(c) Speed. The rate of speed while passing through the canal shall not exceed 5 miles per hour.

(d) Keeping in the center. The center must be kept all the way through, except in passing other craft. In case of grounding, the rapid or strong working of boat's engines is strictly forbidden.

(e)-(g) (Reserved)

(h) Rafts. (1) The passage of bag or sack rafts, or of loose logs, into or through the canal is prohibited.

(2) Rafts shall be made up with logs parallel to each other, in the direction of raft lengths, secured and held closely together by frequent cross-sticks, chains, or cables.

(3) Rafts shall not be of greater dimensions, either way, than 50 feet wide by 600 feet long, and if longer than 300 feet shall be handled by two tugs.

(4) No raft shall pass through the canal, unless by special permission of the superintendent or his authorized assistants, who will direct a time for passing that will least interfere with other navigation.

(5) Masters of tugs and other persons in charge of rafts are required to avoid damaging the canal revetments, and displacing buoys, spars, or the pedestal of any range light aiding navigation through the canal. They shall keep careful watch when passing aids to navigation, and should any be accidentally displaced, shall report the fact at the earliest possible moment to the superintendent or his authorized assistants.

(i) through (l) (Reserved)

(m) Refuse in canal. No person shall roll or throw any stones, ashes, cinders, or other material into the canal or the approaches thereto, or place any such material on any bank or berm of the canal so that it is liable to be thrown or roll in.

(n) (Reserved)

(o) Commercial statistics. The masters or clerks of all vessels using the canal (except in the case of vessels merely entering to seek a harbor of refuge from storms and not bound through) shall furnish in writing to the superintendent a detailed statement of passengers and cargo carried.

§207.476 The Inland Route-lock in Crooked River, Alanson, Mich., use, administration, and navigation.

(a) General. The use, administration, and navigation of the lock shall be under the direction and supervision of the District Engineer, U.S. Army Engineer District, Detroit, Mich., and his authorized agents.

(b) Authority of lockmaster. The lockmaster shall be charged with the immediate control and management of the lock, and of the area set aside as the lock area, including the lock approach channels. He shall see that all laws, rules, and regulations for the use of the lock and lock area are duly complied with, to which end he is authorized to give all necessary orders and directions in accordance therewith, both to the employees of the Government and to any and every person within the limits of the lock area, whether navigating the lock or not. No one shall cause any movement of any boat, craft or other floating object in the lock or approaches except by or under the direction of the lockmaster or his assistants.

(c) Operation. The lock operating season will commence and close as determined by the district engineers, Corps of Engineers in charge of the locality, depending on conditions and the need for lockage services. Public notices will be issued announcing the opening and closing dates at least 15 days in advance of such dates.

(d) Maximum allowable dimensions of craft. (1) Overall length-60 feet.

(2) Overall width-16 feet.

(3) Height above water-15 feet when upper pool is at low water datum.

(4) Draft-6 feet when lower pool is at low water datum.

(e) Signals. (1) Craft desiring lockage in either direction shall give notice to the lock tenders, when not farther than 200 yards from the lock, by one long blast (of 10 seconds duration) followed by one short blast (of 3 seconds duration) of whistle, horn, or siren.

(2) Craft not equipped with whistle, horn, or siren may signal for lockage by use of the signal provided for this purpose located near the extreme end of the guide wall to the starboard side of the craft, both upbound and downbound.

(f) The procedures for transit of lock. (1) Stand clear of the lock while the red signal light shows.

(2) When the green signal light shows and the lock horn sounds three blasts, approach and enter the lock.

(3) Full control of the craft must be maintained while entering the lock.

(4) After entrance to the lock is complete, the craft shall be securely moored to the cleats and bitts situated on the lock wall.

(5) While moored in the lock, the operator of the craft shall maintain constant attention to the mooring lines, to provide slack or retain tautness as needed.

(6) The craft shall remain securely moored until the exit lock gate is fully open and the lock horn sounds one blast.

(7) When the exit lock gate is fully open and the lock horn has sounded one blast, the craft shall immediately leave the lock under full control of its operator.

(g) Precedence at lock. The craft arriving first at the lock shall be first to lock through; but precedence will be given to craft belonging to the United States or to other local government entities, such as State, county, or municipality. Arrival posts may be established above and below the lock. Craft arriving at or opposite such posts or markers will be considered as having arrived at the locks within the meaning of this paragraph.

§207.480 Lake Huron, Mich.; Harbor of refuge, Harbor Beach, use and navigation.

(a) All boats, barges, and vessels entering the harbor will be required to take such positions as may be assigned them by the officer in charge, who will direct their movements, either from the breakwater or from the Government tug on the harbor.

(b) In the absence of any directions as to position, boats, barges, and vessels entering the harbor will observe the following rule: The first steam vessel, or the first steam vessel with consort in tow, on entering the harbor for shelter, will proceed to the upper end of the breakwater. All steam vessels, and all steam vessels with consorts in tow, entering later, will place themselves in a compact position close to those preceding them. Sailing craft will so locate themselves that they will not lie in the way of other vessels entering the harbor. All vessels of every description will in no way place themselves so as to interfere with the work of reconstruction of piers, or repairs, that may be in progress at the time.

(c) The use of chains in making fast to the breakwater will not be permitted. Lines must be attached to the snubbing posts only, and outboard anchors taken in.

(d) Steam craft with barges or vessels in tow will, if practicable, at once place them compactly alongside the breakwater, either taking in the towlines entirely or passing them on the breakwater so as not to interfere in any way with the landing or departure of boats or vessels between them. If impracticable to place them alongside the breakwater, they will each drop anchor and at once take in all towlines extending from one to the other.

(e) Passenger boats will, in general, have the preference as to location and attention by the officer in charge. Rafts will give way to all documented craft.

(f) All classes of boats, barges, vessels, or other floating property making fast to the breakwater must at once place such fenders between themselves and the breakwater as may be thought necessary by the officer in charge to prevent chafing or other damage.

(g) The unloading of wood, coal, ballast, stone, or freight of any class upon the breakwater is expressly prohibited, except in certain cases allowed by special permission from the officer in charge.

(h) Each and every piece of floating property made fast to the breakwater, or anchored in the harbor, must keep outboard from sunset to sunrise a conspicuous white light, and must have upon it and in immediate charge of it a watchman during the entire time such floating property is in the harbor. All colored lights must be at once taken in, or covered, on dropping anchor or making fast to the breakwater.

§207.560 Sandusky Harbor, Ohio; use, administration, and navigation.

(a) through (c) (Reserved)

(d) No vessel shall moor or anchor to any structure of the United States without the consent of the District Engineer, U.S. Army, in charge of the locality, or his authorized agent.

(e) No vessel shall moor or anchor in or along any improved channel or basin in such manner as to interfere with improvement or maintenance operations therein. Whenever in the opinion of the District Engineer any vessel is so moored or anchored, the owner thereof shall cause said vessel to be moved upon notification from and within the time specified by said District Engineer.

§207.565 Vermilion Harbor, Ohio; use, administration, and navigation.

(a) and (b) (Reserved)

(c) No vessel or other craft shall moor or anchor to any structure of the United States without the consent of the District Engineer, Corps of Engineers.

(d) No vessel or other craft shall moor or anchor in or along any improved channel or basin in such a manner as to interfere with the improvement or maintenance operations therein. Whenever in the opinion of the District Engineer any vessel or craft is so moored or anchored, the owner thereof shall cause such vessel or craft to be moved upon notification from, and within the time specified by, the District Engineer.

§207.570 Harbors of Huron, Lorain, Cleveland, Fairport, Ashtabula, Conneaut, Ohio; use, administration, and navigation.

(a) and (b) (Reserved)

(c) No vessel shall moor or anchor to any structure of the United States without the consent of the District Engineer, U.S. Army, in charge of the locality, or his authorized agent.

(d) No vessel shall moor or anchor in or along any improved channel or basin in such manner as to interfere with improvement or maintenance operations therein. Whenever in the opinion of the District Engineer any vessel is so moored or anchored, the owner thereof shall cause said vessel to be moved upon notification from and within the time specified by said District Engineer.

§207.580 Buffalo Harbor, N.Y.; use, administration, and navigation.

(a) and (b) (Reserved)

(c) No vessel shall moor or anchor to any structure of the United States without the consent of the District Engineer, U.S. Army, in charge of the locality, or his authorized agent.

(d) No vessel shall moor or anchor in or along any improved channel or basin in such manner as to interfere with improvement or maintenance operations therein. Whenever in the opinion of the District Engineer any vessel is so moored or anchored, the owner thereof shall cause said vessel to be moved upon notification from and within the time specified by said District Engineer.

§207.590 Black Rock Canal and Lock at Buffalo, N.Y.; use, administration and navigation.

(a) The term "canal" when used in this section will mean all of the Black Rock Waterway, including Black Rock Lock, and all of the lands, piers, buildings, and other appurtenances acquired by letters patent from the State of New York, or constructed for the use of the waterway; the southerly limit thereof being at the southerly end of Bird Island Pier, and the northerly limit being at the downstream end of the guide pier, Black Rock Lock, a length of 3.7 miles.

(b) The canal and all of its appurtenances and the use, administration and navigation thereof shall be in charge of the District Engineer, U.S. Army Engineer District, in charge of the locality, or his authorized agents.

(c) The movement of all vessels, boats, or other floating things in the canal shall be under the direction of the authorized agents of the District Engineer in charge, and their orders and instructions must be obeyed.

(d) For passage through the canal, vessels or boats belonging to the U.S. Government shall have precedence over all others.

(e) All registered vessels or boats must pass through the canal in order of their arrival at the canal limits, unless otherwise directed in accordance with this section.

(f) (Reserved)

(g) No vessel shall pass or approach within ¼-mile of a vessel bound in the same direction in the Black Rock Canal south of the Ferry Street Bridge. Tugs without tows, tugs towing a single barge under 150 feet in length, and single vessels under 150 feet in length are exempt from this paragraph.

(h) No vessel or boat shall anchor in or moor along the canal except at localities specially designated by the District Engineer or his agent; and no business, trading, or landing of freight or baggage, except such articles as may be readily carried in the hand, will be allowed on or over the canal lands or structures, without the permission of the District Engineer or his agent.

(i) No person or operator of a vessel in the Black Rock Canal, lock or approaching channels shall throw or discharge or permit to be thrown or discharged any solid material of any kind or any petroleum product of any kind into the canal, lock or appurtenant waters.

(j) All vessels and tows shall be navigated with care so as not to strike or disturb the channel buoys or channel markers. If a buoy or other channel marker is accidentally struck, damaged or displaced, the fact shall be reported immediately to the Black Rock Lock, foot of Bridge Street, Buffalo, N.Y., telephone 876-5454.

(k) Ferry Street Bridge: The clear headroom under the bridge at low water datum is 17.3 feet for a width of 86 feet from the pivot pier, thence decreasing to 12.3 feet at the left (westerly) abutment.

(1) All vessels and boats which cannot pass under the bridge shall, on approaching the bridge, reduce speed sufficiently to enable them to come to a dead stop, without touching the bridge, in case the movable span cannot be lifted. If the wind is dangerously strong, passage of the bridge shall not be attempted by large vessels without the aid of a tug or tugs.

(2) Vessels and boats bound north shall have the right-of-way and priority for passage through the bridge over those bound south.

(3) All vessels and boats desiring passage through the bridge shall signal therefor by one long and two short whistle blasts.

(4) Upon receiving the opening signal, the bridge operator shall answer by giving the same signal on the bridge whistle and he shall then proceed at once to lift the bridge.

(5) In case the bridge cannot be lifted, for any cause, the bridge operator shall answer a vessel signal by giving five short whistle blasts; and the vessel shall then be stopped until the bridge is ready to be lifted, when the bridge operator shall give the whistle signal for passage and the vessel may proceed.

(6) In case the bridge is disabled so that it cannot be lifted for one-half hour or more pending repairs, red flags will be displayed on the bridge in daytime and two red lantern lights, one above the other, at night; and when such signals are displayed no vessel or boat shall signal for or attempt passage through the bridge.

(l) Radio Control of vessel movement in Black Rock Canal: (1) The movement of vessels in the Black Rock Canal will be controlled by radio communication between the Black Rock Lock and the vessels desiring to use the canal. Vessels will not be permitted to meet or pass in the channel of restricted width between the southerly end of Bird Island (approximately 3,500 feet northerly along the canal from the North Breakwater South End Light) and the International Railway Bridge near the southerly entrance to the Black Rock Lock. Vessels less than 150 feet in length and tugs towing a single barge under 150 feet in length are not to be included in this special condition. In addition to the control of vessel movements in the restricted section of the canal, radio communications will also be utilized to facilitate the passage of vessels through the entire canal and the Black Rock Lock.

(2) Radio communication will be the only means of control of vessel traffic in the canal in order to prevent a meeting or passing of vessels in the restricted area, and therefore it is mandatory that all vessels over 150 feet in length and tugs towing a barge or barges over 150 feet in combined length of tow be equipped with radio communication equipment operating on designated frequencies. Any vessel lacking such equipment will not be permitted to enter the canal unless arrangements are made with the Black Rock Lock by land telephone to 876-5454 or marine ship-to-shore facilities immediately before entering the canal.

(3) The Black Rock Lock radio communications equipment operates on VHF(FM) frequencies as follows: VHF–156.8 MHz–Channel 16–Safety and Calling, VHF–156.7 MHz–Channel 14–Working; VHF–156.6 MHz–Channel 12–Working. A listening watch is maintained on VHF Channel 16.

(4) In order that positive control may be maintained it is mandatory that the following procedures be followed in communicating by radio with the Black Rock Lock:

(i) Vessels desiring to enter the Black Rock Canal from either the Buffalo Outer Harbor or the Buffalo River shall call the Black Rock Lock on VHF Channel 16 or by land telephone approximately 15 minutes before the estimated time of arrival at Buffalo Harbor Traffic Lighted Bell Buoy 1 located at latitude N. 42°50.1′ and longitude W. 78°55.4′. Information to be furnished the Black Rock Lock Operator should include the name of the vessel, position, destination, length, draft (forward and aft), and the type of cargo. A second call shall be made to the lock when the vessel is abreast of the Buffalo Harbor Light on the southerly end of the detached West Breakwater. Information furnished the vessel by the Lock Operator will assure the vessel operator of the proper time to enter the Black Rock Canal with a view to safety and minimum delay.

(ii) Vessels desiring to enter the Black Rock Canal from either the Buffalo Outer Harbor or the Buffalo River shall call the Black Rock Lock on VHF Channel 16 or by land telephone to 876-5454 immediately before departing a dock and again when abreast of the North Breakwater South End Light on the southerly end of the North Breakwater.

(iii) In any radio communication from a vessel to the Black Rock Lock, the VHF (FM) frequencies will be used.

(iv) When an initial radio contact has been made with the Black Rock Lock the vessel entering the canal shall maintain a standby watch at the radio until the passage through the canal and lock is completed.

(v) Failure to comply with the foregoing procedures could result in considerable delay to a vessel and possibly in a collision between vessels in the restricted section of the canal.

(m) Black Rock Lock: All vessels and boats desiring to use the lock shall signal by two long and two short whistle blasts.

(1) Northbound vessels and boats shall not be brought to within less than 300 feet of the upper lock gates, nor shall southbound vessels be brought to within less than 200 feet of the lower lock gates, until the lock is made ready and the lockmaster in charge signals the vessel to enter the lock.

(2) Vessels and boats shall not moor to the approach walls of the lock at either end, for any other purpose than waiting for lockage, except by direction or permission of the lockmaster.

(3) Commercial vessels will receive preference in passage through the locks. Small vessels such as row, sail, and motor boats, bent on pleasure only, will be passed through the lock in company with commercial vessels when small vessels can be safely accommodated or in the absence of commercial vessels may be passed through the lock individually or together in one lockage on the hour if northbound, and on the half hour if southbound. However, commercial vessels will receive preference which could delay the passage of pleasure craft. Pleasure craft will not be permitted to pass through the lock with vessels carrying inflammable cargo. Vessels and other large boats when in the lock shall fasten one head line and one spring line to the snubbing

posts on the lock walls, and the lines shall not be cast off until the signal is given by the lockmaster for the boats to leave the lock.

(4) Vessels and boats will be passed through the lock in order of their arrival except that the lockmaster may order a small vessel to lock through in company with another vessel, irrespective of the former's order of arrival.

(5) All vessels and boats shall be maneuvered with great care so as not to strike any part of the lock walls, or any gate or appurtenance thereto, or machinery for operating the gates, or the walls protecting the lock approaches.

(6) Vessels and boats shall not enter or leave until the lock gates are fully in their recesses, and the lockmaster has given direction for starting.

(7) Upon each passage through the lock, masters or clerks of all vessels and boats (except small motor boats and pleasure craft) shall report to the lock office a statement of passengers, freight, and such other statistical information as may be required by the blank forms which are issued to them for the purpose.

(8) Trespass on lock property is strictly prohibited. However, in that portion of the Black Rock Canal lying between the International Railway Bridge and the northerly end of the westerly lower guide pier, the following conditions shall apply to the embarking or disembarking of crew members or passengers of a vessel transiting the lock:

(i) Only the master or mate and two or three linesmen will be permitted to go ashore from transiting vessels and then only for normal operations and business incident to the transit. A maximum of only four (4) men will be permitted to go ashore from any one ship.

(ii) No crew members will be permitted to board a ship at the locks unless previously requested in writing by the master or owners, and approved by canal authorities.

(iii) No crew member may leave a ship while it is in transit in the lock or canal unless certified in advance as an emergency by the vessel master and approved by canal authorities.

(iv) No guest passengers will be permitted to either board or disembark at the canal or locks.

(9) Schedule of Seasonal Operation:

(i) March 23 through June 14–6 a.m. to 11 p.m., daily.

(ii) June 15 through September 6–24 hours, daily.

(iii) September 7 through November 30–6 a.m. to 11 p.m., daily.

(iv) December 1 through March 22–8 a.m. to 4:30 p.m., daily. During the navigation season the hours may be extended by the district engineer, depending on conditions and the need for lockage service. Public notices will be issued announcing the opening and closing dates at least 10 days in advance of such dates.

(10) Non-Operational Hours Lockings. In addition to the above schedule of operating hours, commercial vessels may be locked through during non-operational hours with prior arrangements made through the U.S. Army Engineer District Buffalo. Requests for non-operational hours lockings shall be made at least 24 hours in advance by calling (716) 876-5454, extension 2284 or by radio as described in paragraph (1) of this section, Monday through Friday, 9 a.m. to 4 p.m., except holidays. Requests shall include the approximate time of arrival and the name and call letters of the vessel or, if the vessel is not equipped to receive radio messages, a telephone number at which messages may be received for the vessel. If a requested lockage must be delayed, prompt notification shall be given by telephone or radio.

§207.600 Rochester (Charlotte) Harbor, N.Y.; use, administration, and navigation.

(a) and (b) (Reserved)

(c) No vessel shall moor or anchor to any structure of the United States without the consent of the District Engineer, U.S. Army, in charge of the locality, or his authorized agent.

(d) No vessel shall moor or anchor in or along any improved channel or basin in such manner as to interfere with improvement or maintenance operations therein. Whenever in the opinion of the District Engineer any vessel is so moored or anchored, the owner thereof shall cause said vessel to be moved upon notification from and within the time specified by said District Engineer.

§207.610 St. Lawrence River, Cape Vincent Harbor, N.Y.; use, administration, and navigation of the harbor and United States breakwater.

(a) through (c) (Reserved)

(d) Vessels shall observe the following rule in mooring to the breakwater: The first self-propelled vessel stopping at the harbor for shelter will proceed to the upstream end of the breakwater and moor along either side of it. All similar vessels entering later will place themselves in a compact position close to those preceding them. Passenger vessels will, in general, have preference as to location of moorage. Sailing craft will so locate themselves that they will not lie in the way of other vessels entering the harbor. All vessels of every description will place themselves so as not to interfere with any work of reconstruction or repair that may be in progress at the time.

(e) The use of chains in making fast to the breakwater is prohibited. Lines must be attached to the snubbing posts only, and outboard anchors taken in.

(f) Vessels with other craft in tow will, if practicable, at once, moor them compactly along the breakwater, either taking in the towlines or placing the slack in them upon the breakwater in such a manner as not to interfere with other vessels. If necessary to moor alongside of other vessels moored to the breakwater, the towlines shall be taken in or disposed of in such a manner as not to interfere with the departure of vessels moored between them and the breakwater.

(g) Vessels of every description mooring to the breakwater, must place suitable fenders between themselves and the breakwater to protect the timber walings on the breakwater from damage.

(h) The unloading of freight of any class upon the breakwater is expressly prohibited, except in accordance with special permission from the said District Engineer or his representative.

(i) Each and every vessel made fast to the breakwater, or anchored in the harbor without a line made fast to the shore or shore dock, must have at least one experienced person upon it during the entire time said vessel is thus moored in the harbor.

Part 334–Danger Zone and Restricted Area Regulations

§334.820 Lake Michigan; naval restricted area, United States Naval Training Center, Great Lakes, Ill.

(a) The area. An area extending in a north and south direction from the Great Lakes, Illinois, south breakwater to an east-west line projecting eastward from the shore termination of the north fence of the United States Naval Training Center, Great Lakes, Illinois, and extending into Lake Michigan for a distance of one mile from the shoreline.

(b) The regulations. No vessel of any kind, except those engaged in naval operations, shall enter, navigate, anchor, or moor in the restricted area without first obtaining permission to do so from the Commander, United States Naval Training Center, Great Lakes, Illinois, or his authorized representative.

§334.830 Lake Michigan; small-arms range adjacent to United States Naval Training Center, Great Lakes, Ill.

(a) The danger zone. An area bounded on the north by latitude 42°20′30″; on the east by longitude 87°47′30″; on the south by latitude 42°18′45″; and on the west by the shoreline.

(b) The regulations. (1) When firing affecting the danger zone is in progress, the enforcing agency will post guards at such locations that the waters in the danger zone may be observed and arrange signals whereby these guards may stop the firing should any person or vessel be seen in the waters of the danger zone. When firing is in progress, the enforcing agency will cause red flags to be displayed on shore near the rifle butts, which may be readily discernible to a person in a vessel within the danger zone.

(2) The enforcing agency is hereby authorized to use such agencies as shall be necessary to prohibit vessels from entering the area until such time as shall be convenient.

(3) If such flags are displayed it will indicate that firing is in progress, and that the waters in the danger zone are subject to impact by rounds missing or richocheting off the impact berm and should not be entered until the flags are lowered.

(4) Wherever possible, the enforcing agency will warn the public of the contemplated times of firing and the areas involved two days in advance of the scheduled date, through the public press and the United States Coast Guard. The danger zone may, however, be closed without advance notice.

(5) (Revoked)

(6) The regulations in this section shall be enforced by the Commander, United States Naval Training Center, Great Lakes, Illinois, and such agencies as he may designate.

§334.840 Waters of Lake Michigan south of Northerly Island at entrance to Burnham Park Yacht Harbor, Chicago, Illinois; danger zone adjacent to airport on Northerly Island.

(1) Danger Zone–(1) Zone A. Beginning at a point 250 feet west of the center line of the runway at the south end of the air strip on Northerly Island; thence 183°, 500 feet; thence 090°, 600 feet; and thence northerly to a point 250 feet east of the center line of the runway at the south end of said air strip. During the navigation season, the southeast and southwest corners of Zone A will be marked with spar buoys colored and lettered as prescribed by the United States Coast Guard.

(2) Zone B. Beginning at the southwest corner of Zone A; thence 183°, 500 feet; thence 090°, 700 feet; thence northerly to the southeast corner of Zone A; and thence 270° to the point of beginning. During the navigation season, the southeast and southwest corners of Zone B will be marked with spar buoys colored and lettered as prescribed by the United State Coast Guard.

(b) Regulations. (1) During daylight hours (from one-half hour before sunrise to one-half hour after sunset), and when the airport on Northerly Island is in operation, no vessel or other watercraft any part of which extends more than 15 feet above the water surface shall enter or remain in Zone A, and no vessel or other watercraft any part of which extends 30 feet or more above the water surface shall enter or remain in Zone B.

(2) When the airport is in operation a red ball, at least three feet in diameter, shall be continuously displayed at the northeast and northwest corners of Zone A. These balls shall not be displayed when the airport is not in operation.

§334.850 Lake Erie, west end, north of Erie Ordnance Depot, Lacarne, Ohio.

(a) The danger zone: Consists of the waters of Lake Erie within:

(1) Danger Area I. The sector of a circle with a radius of 6,500 yards centered at latitude 41°32′30″N., longitude 83°01′00″W., and intersecting the southwest boundary of Area II at latitude 41°35′00″N., longitude 83°03′22″W., and the southeast boundary of Area II at latitude 41°34′20″N., longitude 82°57′10″W.

(2) Danger Area II (Includes Area I). The area bounded as follows: Begining at latitude 41°32′30″N., longitude 83°01′00″W.; thence to latitude 41°35′00″N., longitude 83°03′22″W., thence to latitude 41°36′00″N., longitude 83°03′24″W.; thence to latitude 41°41′30″N., longitude 83°07′30″W.; thence to latitude 41°41′30″N., longitude 83°00′00″W.; thence at latitude 41°35′40″N., longitude 82°54′50″W.; and thence to the point of beginning.

(b) Types of firing:

(1) Danger Area I. Small arms impact area.

(2) Danger Area II. Ground-based artillery, antiaircraft artillery and automatic weapons impact area.

(c) Authorized dates and hours of firing:

(1) Danger Area I. 6 a.m. to 6 p.m., e.s.t./e.d.t., daily; actual firing dates and hours within the authorized period to be announced in advance in special firing notices.

(2) Danger Area II. 8 a.m. to 5 p.m., e.s.t./e.d.t., daily except on Saturdays, Sundays, and holidays; actual firing dates and hours scheduled within authorized period to be announced in advance in special firing notices.

(d) Restrictions:

(1) No vessel shall enter or remain in a danger area during a scheduled firing period announced in a special firing notice unless specific permission is granted in each instance by a representative of the enforcing officer.

(2) The danger areas within the danger zone shall be open to the public for navigation, fishing and other public use when firing and/or bombing is not scheduled.

(e) Enforcing agencies: The regulations in this section shall be enforced for the respective danger areas by the following commanders and such agencies as each may designate for his assigned areas. He will be responsible for providing the prescribed control, signals, and special firing notices.

(1) Danger Area I. Adjutant General, State of Ohio.

(2) Danger Area II. Adjutant General, State of Ohio.

(f) Control and signals:

(1) Danger Area I: When firing into Area I, red flags will be flown from the safety tower at Camp Perry, and from flag poles in the butts of the ranges being used.

(2) Danger Area II: During all types of firing into Area II, red flags will be displayed, one from the safety tower at Camp Perry and one from the safety tower at the Proof Facility at the Erie Industrial Park (Erie Proof Front). During firing into Area II, patrol boats will police and maintain surveillance of the area, and will be in constant radio communication with the shore station controlling the firing.

(3) (Reserved)

(4) The appropriate enforcing officer has authority to suspend any scheduled firing for reasonable periods during regattas and immediately after fishing nets are destroyed or dislocated by severe storms.

(5) The special firing notices which will include schedules of use will be published by the enforcing officer indicated in paragraph (e) of this section, in sufficient time to permit circularization to interested parties and posting on the bulletin boards of post offices in surrounding localities. Special notices will also be furnished the District Engineer, Corps of Engineers, Detroit, Mich.; the Commander, Ninth Coast Guard District, Cleveland, Ohio; the Regional Manager, Federal Aviation Administration, Chicago, Ill.; and each of the enforcing agencies listed in paragraph (e) of this section. Users of the waterway shall familiarize themselves with the current special firing notices. If in doubt, inquiry should be made to the enforcing officer indicated in paragraph (e) of this section.

(6) Agencies desiring to use the areas shall present their requirements to the respective enforcing officer who is responsible for, and is granted authority to, coordinate the firing and established priorities, for the using agencies.

(g) Fishing permits: Fishermen desiring to set fixed nets within the danger zone are required in every instance to have written permits. Permits for placing nets within Areas I and II may be obtained by written application to the Adjutant General, State of Ohio. Applicants for permits must state the location at which they desire to set fixed nets and the period of time which they desire the permit to cover.

(h) Injurious chemicals: No phosphorus or other poisonous chemicals injurious to wild fowl or fish will be discharged into the waters of the areas.

(i) The regulations in this section shall be revised annually by the Department of the Army to determine whether further limitations of the danger zone shall be considered.

Part 401–Seaway Regulations and Rules

Note.–Regulations of this Part (33 CFR 401) are not contained in this Coast Pilot but are contained in the Seaway Handbook, issued jointly by and available from The Saint Lawrence Seaway Development Corporation and The St. Lawrence Seaway Authority. (See St. Lawrence Seaway, chapter 3, and appendix for addresses.)

Title 36–Parks, Forests, and Public Property

Part 1–Miscellaneous Provisions

§1.1 Applicability and scope.

(a) The regulations contained in Parts 1 through 6 of this chapter shall apply to all persons entering, using, visiting, or who are otherwise within the boundaries of any federally owned or controlled areas administered by the National Park Service, except: (1) Areas administered by the National Park Service in the District of Columbia and its environs to which Part 50 is specifically applicable, and (2) national cemeteries to which Part 12 is specifically applicable. The special regulations in Part 7 of this chapter also apply to all persons entering, using or visiting the areas for which they are adopted. The regulations contained in Parts 1 through 7 of this chapter are hereby made and prescribed for the proper use, management, government and protection of, and maintenance of good order in the areas to which they apply.

§1.3 Penalties.

(a) and (b) not carried in this Coast Pilot.

(c) Any person convicted of violating any provision of the regulations contained in Parts 1 through 7 of this chapter, or as the same may be amended or supplemented within any park area established pursuant to the Act of August 21, 1935 (49 Stat. 666), shall be punished by a fine of not more than $500 and shall be adjudged to pay all costs of the proceedings. (16 U.S.C. 462)

Part 2–Public Use and Recreation

§2.2 Aircraft.

(a) The operation or use of aircraft on lands or waters other than at the landing areas designated in special regulations is prohibited. Where a water surface is designated as a landing area, the operation or use of aircraft on the water within 500 feet of bathing beaches, boat docks, floats, piers, ramps, or within 1 mile of water control structures, except as otherwise provided by special regulations, is prohibited.

(b) Except in extreme emergencies involving the safety of human life or threat of serious property loss, the air delivery of any person or thing by parachute, helicopter, or other means without prior written permission of the Superintendent is prohibited.

(c) The provisions of this section shall not be applicable to aircraft engaged on official business of the Federal Government, or used in emergency rescue in accordance with the directions of the Superintendent, or forced to land due to circumstances beyond the control of the operator.

Part 7–Special Regulations, Areas of the National Park System

§7.38 Isle Royale National Park.

(a) Aircraft, designated landing areas.

(1) The portion of Tobin Harbor located in the NE¼ of sec. 4, T. 66 N., R. 33 W.; the SE¼ of sec. 33, T. 67 N., R. 33 W., and the SW¼ of sec. 34, T. 67 N., R. 33 W.

(2) The portion of Rock Harbor located in the SE¼ of sec. 13, the N½ of sec. 24, T. 66 N., R. 34 W., and the W½ of sec. 18, T. 66 N., R. 33 W.

(3) The portion of Washington Harbor located in the N½ of sec. 32, all of sec. 29, SE¼ of sec. 30, and the E½ of sec. 31, T. 64 N., R. 38 W.

(b) Underwater diving. No person shall undertake diving in the waters of Isle Royale National Park with the aid of underwater breathing apparatus without first registering with the Superintendent.

(c) Mammals. Dogs, cats, and other mammals may not be brought into or possessed in the park area, except for guide dogs accompanying the blind.

Title 40–Protection of Environment

Part 140–Marine Sanitation Device Standard

Standards of Performance

Initial standards and regulations promulgated under section 13 of the Act preempt any statute or regulation of a State or political subdivision with respect to the design, manufacture, or installation or use of any marine sanitation device on any vessel subject to section 13. However, such preemption does not take place until the effective date of the initial standards and regulations, including the regulations to be promulgated by the Secretary of Transportation. In accordance with section 13, this regulation becomes effective for new vessels 2 years after promulgation of the regulations by the Secretary of Transportation and for existing vessels 5 years after such promulgation.

It should be noted that, in accordance with section 13 of the Act, these standards apply only to navigable waters of the United States. Many inland lakes and rivers do not connect with bodies of water used in interstate commerce and hence are not part of the navigable waters of the United States. Consequently, they are not covered by these regulations.

§140.1 Definitions.

For the purpose of these standards the following definitions shall apply:

(a) "Sewage" means human body wastes and the wastes from toilets and other receptacles intended to receive or retain body wastes;

(b) "Discharge" includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping;

(c) "Marine sanitation device" includes any equipment for installation on board a vessel and which is designed to receive, retain, treat, or discharge sewage, and any process to treat such sewage;

(d) "Vessel" includes every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on the navigable waters of the United States;

(e) "New vessels" refers to any vessel on which construction was initiated on or after January 30, 1975;

(f) "Existing vessel" refers to any vessel on which construction was initiated before January 30, 1975;

(g) "Fecal coliform bacteria" are those organisms associated with the intestine of warm blooded animals that are commonly used to indicate the presence of fecal material and the potential presence of organisms capable of causing human disease.

§140.2 Scope of standard.

The standard adopted herein applies only to vessels on which a marine sanitation device has been installed. The standard does not require the installation of a marine sanitation device on any vessel that is not so equipped. The standard applies to vessels owned and operated by the United States unless the Secretary of Defense finds that compliance would not be in the interest of national security.

§140.3 Standard.

(a)(1) In freshwater lakes, freshwater reservoirs or other freshwater impoundments whose inlets or outlets are such as to prevent the ingress or egress by vessel traffic subject to this regulation, or in rivers not capable of navigation by interstate vessel traffic subject to this regulations, marine sanitation devices certified by the U.S. Coast Guard (see 33 CFR Part 159, published in 40 FR 4622, January 30, 1975), installed on all vessels shall be designed and operated to prevent the overboard discharge of sewage, treated or untreated, or of any waste derived from sewage. This shall not be construed to prohibit the carriage of Coast Guard-certified flow-through treatment devices which have been secured so as to prevent such discharges.

(2) In all other waters, Coast-Guard-certified marine sanitation devices installed on all vessels shall be designed and operated to either retain, dispose of, or discharge sewage. If the device has a discharge, subject to paragraph (d) of this section, the effluent shall not have a fecal coliform bacterial count of greater than 1,000 per 100 milliliters nor visible floating solids. Waters where a Coast Guard-certified marine sanitation device permitting discharge is allowed include coastal waters and estuaries, the Great Lakes and inter-connected waterways, freshwater lakes, and impoundments accessible through locks, and other flowing waters that are navigable interstate by vessels subject to this regulation.

(b) This standard shall become effective on January 30, 1977 for new vessels and on January 30, 1980 for existing vessels (or, in the case of vessels owned and operated by the Department of Defense, two years and five years, for new and existing vessels, respectively, after promulgation of implementing regulations by the Secretary of Defense under section 312(d) of the Act).

(c) Any vessel which is equipped as of the date of promulgation of this regulation with a Coast Guard-certified flow-through marine sanitation device meeting the requirements of paragraph (a)(2) of this section, shall not be required to comply with the provisions designed to prevent the overboard discharge of sewage, treated or untreated, in paragraph (a)(1) of this section, for the operable life of that device.

(d) After January 30, 1980, subject to paragraphs (e) and (f) of this section, marine sanitation devices on all vessels on waters that are not subject to a prohibition of the overboard discharge of sewage, treated or untreated, as specified in paragraph (a)(1) of this section, shall be designed and operated to either retain, dispose of, or discharge sewage, and shall be certified by the U.S. Coast Guard. If the device has a discharge, the effluent shall not have a fecal coliform bacterial count of greater than 200 per 100 milliliters, nor suspended solids greater than 150 mg/1.

(e) Any existing vessel on waters not subject to a prohibition of the overboard discharge of sewage in paragraph (a)(1) of this section, and which is equipped with a certified device on or before January 30, 1978, shall not be required to comply with paragraph (d) of this section, for the operable life of that device.

(f) Any new vessel on waters not subject to the prohibition of the overboard discharge of sewage in paragraph (a)(1) of this section, and on which construction is initiated before January 31, 1980, which is equipped with a marine sanitation device before January 31, 1980, certified under paragraph (a)(2) of this section, shall not be required to comply with paragraph (d) of this section, for the operable life of that device.

(g) The degrees of treatment described in paragraphs (a) and (d) of this section are "appropriate standards" for purposes of Coast Guard and Department of Defense certification pursuant to section 312(g)(2) of the Act.

(h) This section is not to be construed to accelerate the effective date of the standards and regulations promulgated under section 312 as such date affects the sales regulations for marine sanitation devices specified in section 312(g)(1): January 30, 1977, and January 30, 1980, for new and existing vessels, respectively.

§140.4 Complete prohibition.

(a) A State may completely prohibit the discharge from all vessels of any sewage, whether treated or not, into some or all of the waters within such State by making a written application to the Administrator, Environmental Protection Agency, and by receiving the Administrator's affirmative determination pursuant to section 312(f)(3) of the Act. Upon receipt of an application under section 312(f)(3) of the Act, the Administrator will determine within 90 days whether adequate facilities for the safe and sanitary removal and treatment of sewage from all vessels using such waters are reasonably available. Applications made by States pursuant to section 312(f)(3) of the Act shall include: (1) A certification that the protection and enhancement of the waters described in the petition require greater environmental protection than the applicable Federal standard; (2) a map showing the location of commercial and recreational pump-out facilities; (3) a description of the location of pump-out facilities within waters designated for no discharge; (4) the general schedule of operating hours of the pump-out facilities; (5) the draught requirements on vessels that may be excluded because of insufficient water depth adjacent to the facility; (6) information indicating that treatment of wastes from such pump-out facilities is in conformance with Federal law; and (7) information on vessel population and vessel usage of the subject waters.

(b) A State may make a written application to the Administrator, Environmental Protection Agency, under section 312(f)(4) of the Act, for the issuance of a regulation completely prohibiting discharge from a vessel of any sewage, whether treated or not, into particular waters of the United States or specified portions thereof, which waters are located within the boundaries of such State. Such application shall specify with particularity the waters, or portions thereof, for which a complete prohibition is desired. The application shall include identification of water recreational areas, drinking water intakes, aquatic sanctuaries, identifiable fish-spawning and nursery areas, and areas of intensive boating activities. If, on the basis of the State's application and any other information available to him, the Administrator is unable to make a finding that the waters listed in the application require a complete prohibition of any discharge in the waters or portions thereof covered by the application, he shall state the reasons why he cannot make such a finding, and shall deny the application. If the Administrator makes a finding that the waters listed in the application require a complete prohibition of any discharge in all or any part of the waters or portions thereof covered by the State's application, he shall publish notice of such findings together with a notice of proposed rule making, and then shall proceed in accordance with 5 U.S.C. 553. If the Administrator's finding is that applicable water quality standards require a complete prohibition covering a more restricted or more expanded area than that applied for by the State, he shall state the reasons why his finding differs in scope from that requested in the State's application.

(1) For the following waters the discharge from a vessel of any sewage (whether treated or not) is completely prohibited:

Boundary Waters Canoe Area, formerly designated as the Superior, Little Indian Sioux, and Caribou Roadless Areas, in the Superior National Forest, Minnesota, as described in 16 U.S.C. 577-577d1.

§140.5 Analytical procedures.

In determining the composition and quality of effluent discharged from marine sanitation devices the procedures contained in 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants," or subsequent revisions or amendments thereto, shall be employed.

Title 46–Shipping

Part 401–Great Lakes Pilotage Regulations (in part)

Subpart A–General

§401.110 Definitions.

(a) The following terms where used in this part shall have the following meanings:

(1) "Act" means the Great Lakes Pilotage Act of 1960, as amended (Public Law 86-555, 74 Stat. 259-262; 46 U.S.C. 216-216i).

(2) "Commandant" means Commandant, U.S. Coast Guard, Department of Transportation, Washington, D.C. 20593.

(3) through (4) not carried in this Coast Pilot.

(5) "Great Lakes" means Lakes Superior, Michigan, Huron, Erie, and Ontario, their connecting and tributary waters, the St. Lawrence River as far east as Saint Regis, and adjacent port areas.

(6) through (8) not carried in this Coast Pilot.

(9) "Director" means Director, Great Lakes Pilotage Staff, on the staff of the Commander, Ninth Coast Guard District (dgp), Federal Office Building, 1240 East Ninth Street, Cleveland, Ohio 44199.

(10) Rate computation definitions:

(i) "Length" means the distance between the forward and after extremities of the ship.

(ii) "Breadth" means the maximum breadth to the outside of the shell plating of the ship.

(iii) "Depth" means the vertical distance at amidships from the top of the keel plate to the uppermost continuous deck, fore and aft, and which extends to the sides of the ship. The continuity of a deck shall not be considered to be affected by the existence of tonnage openings, engine spaces, or a step in the deck.

(11) "Person" includes an individual, registered pilot, partnership, corporation, association, voluntary association, authorized pool, or public or private organization, other than an agency.

(12) through (15) not carried in this Coast Pilot.

§401.120 Federal Reservation of Pilotage Regulations.

No state, municipal, or other local authority shall require the use of pilots or regulate any aspect of pilotage in any of the waters specified in the Act. Only those persons registered as United States Registered Pilots or Canadian Registered Pilots as defined in this subpart may render pilotage services on any vessel subject to the Act and the Memorandum of Arrangements, Great Lakes Pilotage.

Subpart E–Penalties; Operations Without Registered Pilots

§401.500 Penalties for Violations.

Any person who violates any provision of this part shall be liable to the United States in a civil penalty not exceeding $500 for each violation. Such penalty may be remitted or mitigated, upon application therefor, by the Commandant upon such terms as he, in his discretion, shall think proper.

§401.510 Operation without Registered Pilots.

(a) A vessel may be navigated in the U.S. waters of the Great Lakes without a United States or Canadian Registered Pilot when the vessel or its cargo is in distress or jeopardy.

(b) A vessel may be navigated in the U.S. waters of the Great Lakes without a United States or Canadian Registered Pilot when the Director, with the concurrence of the Commander, 9th Coast Guard District, notifies the master that a United States or Canadian Registered Pilot is not available.

(1) Notification to the master that a pilot is not available will be made by the Director through the appropriate pilotage pool, either orally or in writing as the circumstances admit, and shall not be deemed given until the notice is actually delivered to the vessel by the pilotage pool.

(2) The determination that a pilot is not available will be made on an individual basis and only when a vessel has given proper notice of its pilotage service requirements to the pilotage pool having dispatching jurisdiction at the time. The vessel has no obligation or responsibility with respect to such notification other than properly informing the pilotage pool of its pilotage requirements. However, the failure or delay by the pool in processing a pilotage service request, or refusal or delay by the Coast Guard in notifying the vessel that a pilot is not available, does not constitute constructive notice that a pilot is not available, and the vessel is not relieved by such failure or delay from compliance with the Great Lakes Pilotage Act of 1960.

(3) Upon receipt of proper notice of a vessel's pilotage requirements, the pilotage pool shall then determine from the tour de role the availability of a pilot to render the service required. If no pilot is

reasonably expected to be available for service within 6 hours of the time the pilotage services are required by the vessel, the pilotage pool shall promptly inform the Director through the U.S. Coast Guard communications system in the manner as may be prescribed from time to time by the Commandant. The Director shall be informed of:

(i) Name and flag of the vessel:

(ii) Route of vessel for which a pilot is not available;

(iii) Time elapsing before a pilot is reasonably expected to become available;

(iv) Whether vessel has an "other officer" on board;

(v) Familiarity of master with route to be transited by the vessel;

(vi) Draft of vessel; and

(vii) Any circumstance of traffic or weather, or condition of the vessel or its cargo which would adversely affect the safety of the vessel in transiting without a pilot.

(4) When a pilot is expected to become available within 6 hours of the time his services are required, the vessel shall be informed that a pilot is available and approximate time he will report on duty. However, should any unusual circumstance or condition exist which may justify notification that a pilot is not available in less than 6 hours, the pilotage pool shall inform the Director as in paragraph (b)(3) of this section, along with the circumstances involved. Every reasonable effort is to be made to prevent delay to the vessel consistent with the intent and purpose of the Great Lakes Pilotage Act of 1960.

(5) Any vessel which requires the services of a pilot and is navigated without a pilot or proceeds prior to receipt of a message that a pilot is not available pursuant to paragraph (b)(1) of this section shall be reported as in violation of section 7 of the Great Lakes Pilotage Act of 1960 by the pilotage pool to the local Coast Guard unit having jurisdiction. If the message is received after the vessel proceeds, such message shall not be delivered without concurrence of the Coast Guard officer to whom the violation was reported.

(6) U.S. pilotage pools informing the Director that a pilot is not available for a vessel shall also obtain notice that pilot is not available from the appropriate Canadian Supervisor of Pilots for those portions of the route which are in Canadian waters in the manner prescribed by them. The notice for Canadian District No. 1 waters shall be obtained from the Supervisor of Pilots, Department of Transport, Cornwall, Ontario, and the notice for Canadian District No. 2 waters shall be obtained from the Supervisor of Pilots, Department of Transport, Port Weller, Ontario. Authority to issue notice for Canadian waters of District No. 3 has been granted to the Director by the Department of Transport, Ottawa, and separate notice from Canada for this District is not required until such time as separate Canadian pilotage dispatch facilities may be established.

(7) Notice that a pilot is not available shall not be delivered to any vessel unless the message contains the concurrence of the Commander, 9th Coast Guard District, and notice for Canadian waters of Districts No. 1 and No. 2, if required, has been obtained from the appropriate Canadian authority.

(8) In the event of an emergency or any other compelling circumstance, the Director may issue, without the specific request for service as provided under paragraph (b)(2) of this section, individual or general notification that a pilot or pilots are not available. Pilotage pools shall advise the Director of any condition or circumstance coming to their attention which may warrant such a determination.

Title 47–Telecommunication

Part 83–Stations on Shipboard in the Maritime Services

Subpart U–Radiotelephone Installations Provided for Compliance With the Great Lakes Radio Agreement

§83.536 Applicability to vessels.

The Agreement Between the United States of America and Canada for Promotion of Safety on the Great Lakes by Means of Radio, 1973, applies to vessels of all countries when navigated on the Great Lakes. The Great Lakes Agreement defines the Great Lakes as "all waters of Lakes Ontario, Erie, Huron (including Georgian Bay), Michigan, Superior, their connecting and tributary waters and the River St. Lawrence as far east as the lower exit of the St. Lambert Lock at Montreal in the Province of Quebec, Canada," but shall not include such of the connecting and tributary waters as may be specified in the Technical Regulations." The Technical Regulations do not include any connecting and tributary waters except the St. Mary's River, the St. Clair River, Lake St. Clair, the Detroit River and the Welland Canal. A vessel to which the Great Lakes Agreement applies and which falls into the specific categories by paragraph (a), (b) or (c) of this section and not excepted by paragraph (d) or (e) of this section shall comply with this subpart while navigated on the Great Lakes.

(a) Every vessel 20 meters (65 feet) or over in length (measured from end to end over the deck, exclusive of sheer).

(b) Every vessel engaged in towing another vessel or floating object, except:

(1) Where the maximum length of the towing vessel, measured from end to end over the deck exclusive of sheer, is less than twenty-six (26) feet and the length or breadth of the tow, exclusive of the towing line, is less than 20 meters (65 feet);

(2) Where the vessel towed complies with this subpart;

(3) Where the towing vessel and tow are located within a booming ground (an area in which logs are confined); or

(4) Where the tow has been undertaken in an emergency and neither the towing vessel nor the tow can comply with this part.

(c) Any vessel carrying more than six passengers for hire.

(d) The requirements of the Great Lakes Agreement shall not apply to:

(1) Ships of war and troop ships;

(2) Vessels owned and operated by any national government and not engaged in trade.

(e) The Commission may, if it considers that the conditions of the voyage or voyages affecting safety (including but not necessarily limited to the regularity, frequency and nature of the voyages, or other circumstances) are such as to render full application of the Great Lakes Agreement unreasonable or unnecessary, may exempt partially, conditionally or completely any individual vessel for one or more voyages or for any period of time not exceeding one year.

§83.537 Survey and certification.

Each vessel of the United States subject to the Great Lakes Agreement shall have a periodic survey of the required radiotelephone installation not less than once every twelve months; however, a one month extension of a certificate issued by the Commission may be granted by Commission inspection personnel in order to allow for more flexibility in their inspection workload. This survey shall be made while the vessel is in active service or within not more than one month before the date on which it is placed in service. A Great Lakes Agreement Radiotelephony Certificate will be issued to vessels found, as a result of the periodic survey, to be in compliance with the Agreement. Such certificate shall be prominently posted at the principal operating position of the required radiotelephone installation.

§83.539 Radiotelephone installation.

(a) Each vessel of the United States of less than 38 meters (124 feet) registered length while subject to the requirements of the Great Lakes Radio Agreement shall be fitted with a radiotelephone in effective operating condition meeting the provisions of this subpart in addition to the provisions of such other rules in this part, governing ship stations using telephony, as are applicable.

(b) Each vessel of the United States of 38 meters (124 feet) or more while subject to the requirements of the Great Lakes Radio Agreement shall be fitted with a minimum of two VHF radiotelephone installations in effective operating condition meeting the provisions of this subpart in addition to the provisions of such other rules in this part, governing ship stations using telephony, as are applicable. The second VHF installation shall be electrically separate from the first VHF installation; however, both may be connected to the main source of energy provided one installation can be operated from a separate source of energy located as high as practicable on the vessel.

(c) The term "radiotelephone installation", for the purpose of the Great Lakes Agreement, means a ship radio station (including the source of power necessary to energize the apparatus) capable of transmitting and receiving F3 emission as follows:

(1) Each VHF radiotelephone installation.

(i) Channel 16–156.8 MHz–Distress, Safety and Calling.

(ii) Channel 6–156.3 MHz–Primary intership.

(2) The radiotelephone station shall have additional frequencies as follows:

(i) Those ship movement frequencies appropriate to the vessel's area of operation: Channel 11–156.55 MHz, Channel 12–156.60 MHz, Channel 13–156.65 MHz or Channel 14–156.7 MHz.

(ii) Such other frequencies as required for the vessel's service.

(iii) One channel for receiving marine navigational warnings for the area of operation.

(3) Nothing contained in this paragraph shall be construed to require or prohibit the availability of other frequencies for use by the same "radiotelephone installation" for communication authorized by this part on other frequencies.

(d) Every radiotelephone station shall include one or more transmitters, one or more receivers, one or more sources of electrical energy; and associated antennas and control equipment. The radiotelephone station, exclusive of the antennas and source of electrical energy, shall be located as high as practicable on the vessel, preferably on the bridge, and suitably protected from the harmful effects of water, temperature, electrical and mechanical noise.

§83.541 Principal operating position.

(a) The principal operating position of the radiotelephone installation shall be on the bridge, convenient to the conning position.

(b) Where the radiotelephone station is located elsewhere than on the bridge, provision shall be made for operational control of the equipment at that location and at the bridge operating position. However, provision shall be made to take immediate and complete control of the equipment at the bridge operating position.

§83.542 Radiotelephone transmitter.

(a) The transmitter shall be capable of effective transmission of F3 emission on the required frequencies, and such other frequencies as are required for their service.

(b) The transmitter shall be of a type which has been demonstrated in the process of type acceptance as being capable of delivering a carrier power of at least 10 watts, but not more than 25 watts, on each of the frequencies 156.8 MHz and 156.3 MHz into 50 ohms effective resistance, when operated with its applied primary supply voltage. The transmitter shall be capable of readily reducing the carrier power to one watt or less.

(c) When an individual demonstration of the capability of the transmitter is deemed necessary in the judgment of the Commission, measurements of primary supply voltage and transmitter output power shall be made with the equipment drawing energy from the ship's main source of energy, as follows:

(1) The primary supply voltage measured at the power input terminals to the transmitter terminated in a matching artificial load, shall be measured at the

end of 10 minutes of continuous, uninterrupted operation of the transmitter at its full power output.

(2) The primary supply voltage, measured in accordance with the procedures of this paragraph, shall be not less than 11.5 volts.

(3) The transmitter at full output power measured in accordance with the procedure of this paragraph shall not be less than 10 watts.

§83.543 Radiotelephone receiver.

(a) The receiver used for maintaining the listening watch required by §83.206 shall be capable of effective reception of F3 emission on the required frequencies.

(b) The receiver shall have a sensitivity of at least two microvolts across 50 ohm or equivalent input terminals, for a 20 decibel signal-to-noise ratio.

§83.544 Main source of energy.

(a) A main source of energy of sufficient capacity to energize the radiotelephone installation properly and immediately shall be available at all times while the vessel is subject to the requirements of the Great Lakes Radio Agreement.

(b) Means shall be provided for adequately charging any storage batteries used as a main source of energy, or any part thereof. There shall be provided a device which during charging of the batteries, will give a continuous indication of the rate and polarity of the charging current.

§83.545 Auxiliary source of energy.

(a) Each passenger vessel of more than 100 gross tons and each cargo vessel of more than 300 gross tons shall be provided with an auxiliary source of energy independent of the vessel's normal electrical system and capable of properly energizing the radiotelephone installation and illuminating the operating controls at the principal operating position prescribed in §83.547, for at least two continuous hours under normal operating conditions. When meeting this two hour requirement, such auxiliary source of energy shall be located on the bridge level or at least one deck above the vessel's main deck.

(b) In lieu of the independent source of energy specified in paragraph (a) of this section, the vessel may be provided with an auxiliary radiotelephone installation having a power source independent of the vessel's normal electrical system. Any such installation must comply with §§83.539, 83.541, 83.542, 83.543, 83.547 and 83.548, as well as the general technical standards contained in this part. Additionally, the power supply for any such auxiliary radiotelephone shall be regarded as an "auxiliary source of energy" for the purposes of paragraphs (c), (d) and (e) of this section.

(c) Means shall be provided for adequately charging any storage batteries used as an auxiliary source of energy, or any part thereof, for the required radiotelephone installation. There shall be provided a device which, during charging of the batteries, will give a continuous indication of the rate and polarity of the charging current.

(d) Use of the auxiliary source of energy, when required by paragraph (a) of this section, shall be available within one minute after the need for its use.

(e) The station licensee, when directed by the Commission, shall prove by demonstration as prescribed in paragraphs (e) (1), (2), (3) and (4) of this section or by such other means as may be deemed necessary, that the auxiliary source of energy is capable of meeting the requirements of paragraph (a) of this section as follows:

(1) When the auxiliary source of energy consists of or includes a storage battery, proof of the ability of such battery to operate continuously and effectively over the required period of time is authorized to be established by a discharge test over the required period of time, when supplying power at the voltage required for normal and effective operation to an electric load as prescribed by paragraph (e)(3) of this section.

(2) When the auxiliary source of energy consists of or includes an enginedriven generator, proof of the adequacy of the engine fuel supply to operate the unit continuously and effectively over the required period of time may be established by using as a basis the fuel consumption during a continuous period of one hour when supplying power, at the voltage required for normal and effective operation, to an electrical load as prescribed by paragraph (3)(e) of this section.

(3) For the purposes of determining the electrical load to be supplied, the following formula shall be used:

(i) One-half the current consumption of the radiotelephone while transmitting at its rated power output, less one-half the current consumption while not transmitting; plus

(ii) Current consumption of the required receiver; plus

(iii) Current consumption of the source of illumination provided for the operating controls prescribed by §83.547; plus

(iv) The sum of the current consumption of all other loads to which the auxiliary source of energy may supply power in time of emergency or distress.

(4) At the conclusion of the test specified in paragraphs (e)(1) and (2) of this section, no part of the auxiliary source of energy shall have excessive temperature rise, nor shall the specific gravity or voltage of any storage battery be below the 90 percent discharge point as determined from information (such as voltage curves or specific gravity tables) supplied by the manufacturer of the type of battery involved.

§83.546 Antenna system.

The antenna provided shall be effective, vertically polarized and located as high as practicable on the masts or superstructure of the vessel. The transmission line shall be effective and, to the extent practicable, shall impose a minimum loss.

§83.547 Illumination of operating controls.

(a) The radiotelephone shall have dial lights which clearly illuminate the operating controls at the principal operating position.

(b) In lieu of paragraph (a) of this section, a light from an electric source of energy may be provided and permanently arranged to illuminate the operating controls of the radiotelephone at the principal operating position. If an auxiliary source of energy is required to be provided on board the vessel, arrangements shall be provided to permit the use of such source of energy for such illumination within one minute after the need arises for its use.

§83.548 Trial of radiotelephone installation.

At least once during each calendar day in which a vessel of the United States is navigated while subject to the Great Lakes Radio Agreement, a test communication on 156.8 MHz to demonstrate that the radiotelephone installation is in proper operating condition shall be made by a licensed operator as required in §83.157, unless the normal daily use of the equipment demonstrates that this installation is in proper operating condition. Should the equipment be found at any time by a person other than the master not to be in operating condition, the master shall be promptly notified. A record shall be made in the radio station log showing the operating condition of the equipment as determined either by daily normal communication or the daily test communication referred to in this section, and showing that, if an improper operating condition was found, the master was properly notified thereof.

Canadian Regulations.

Canadian Charts and Publications Regulations.–His Excellency the Governor General in Council, on the recommendation of the Minister of Transport, pursuant to section 400 of the Canada Shipping Act and section 739 of the Canada Shipping Act, as enacted by section 2 of an Act to Amend the Canada Shipping Act Chapter 27 of the Statutes of Canada, 1970-1971, is pleased hereby (Canada Gazette, Part II, Vol. 106, No. 15, dated 28 July, 1972) to make the annexed Regulations requiring ships to have on board, maintain and use appropriate charts, tide tables, lists of lights and other nautical publications, effective October 1st, 1972, as amended:

Short Title.

1. These Regulations may be cited as the **Charts and Publications Regulations.**

Interpretation.

2. In these Regulations **"chart"** means a nautical chart; **"Information Bulletin"**, in respect of an area to be navigated by a ship, means the chart catalogue for that area published by the Canadian Hydrographic Service; **"national authority"** means the government of a country; **"ship"** includes every description of vessel used in navigation and not propelled by oars.

Part 1–Ships in Canadian Waters and Fishing Zones

Application.

3.(1) Subject to subsection (2), this Part applies to all self-propelled ships, other than ships of war, in

(a) Canadian waters south of the sixtieth parallel of north latitude;

(b) Canadian waters north of the sixtieth parallel of north latitude that are not within a shipping safety control zone prescribed pursuant to the Arctic Waters Pollution Prevention Act; and

(c) a fishing zone of Canada prescribed pursuant to the Territorial Sea and Fishing Zones Act.

(2) This Part does not apply to a ship that is of less than 100 tons, gross tonnage, if the person in charge of the navigation of that ship

(a) is informed of the location and character of charted

(i) shipping routes,

(ii) lights, buoys and marks, and

(iii) navigational hazards, and

(b) has a general knowledge of the prevailing navigational conditions in the area in which the ship is to be navigated.

Carriage of Charts and Publications.

4.(1) Every ship shall have on board, in respect of each area to be navigated by the ship, at least the latest editions of such charts and the most recent issues of such publications as are necessary for the ship to comply with sections 5 to 7.

(2) When making a voyage described in column I of an item of the schedule, every ship shall, in addition to the charts required by subsection (1), have on board

(a) the latest editions of the Canadian Hydrographic Service charts described in column II of that item; or

(b) the latest editions of the charts published by any national authority that

(i) cover the same area as,

(ii) are at least as complete, accurate, intelligible and up-to-date as, and

(iii) are at a scale that is at least 75 percent of the scale of the latest editions of the charts described in column II of that item.

Use of Charts.

5.(1) Subject to subsection (2), every ship shall, in respect of the immediate area in which the ship is located, make proper navigational use of a chart that

(a) is published by a national authority;

(b) covers that immediate area; and

(c) provides a representation of the area covered by the chart that is

(i) as complete, accurate, intelligible and up-to-date as, and

(ii) at a scale that is at least 75 per cent of the scale of the largest scale chart described in the most recent issue of the Information Bulletin that is a chart of that immediate area.

(2) Where a ship is located

(a) more than five nautical miles from any charted feature or charted depth of water that represents a potential hazard to the ship, or

(b) within the area covered by a chart described in the most recent issue of the Information Bulletin as a chart

(i) primarily intended for the use of pleasure craft, or

(ii) primarily of an anchorage, a river or a harbour that is not entered by the ship, paragraph (1)(c) shall be deemed to refer to the second-largest scale chart of that immediate area as described in the most recent issue of the Information Bulletin, if that second-largest scale chart is at a scale of not less than 1:400,000 (5.486 nautical miles to the inch or 2.160 nautical miles to the centimeter).

Use of Other Publications.

6.(1) Subject to subsections (2) and (3), every ship shall, in respect of each area to be navigated by the ship, make proper navigational use of

(a) the following Canadian Government publications:

(i) tide and current tables;

(ii) sailing directions;

(iii) Lists of Lights, Buoys and Fog Signals;

(iv) where the ship is fitted with radio equipment, Radio Aids to Marine Navigation;

(v) Code of Navigation Practices and Procedures; and

(vi) where the ship is making a voyage during which ice may be encountered, Ice Navigation in Canadian Waters;

(b) the Information Bulletin; and

(c) the annual edition of Canadian Notices to Mariners.

(2) A publication of any national authority may be substituted for any Canadian Government publication described in paragraph (1)(a), if the publication is, in respect of information that may affect the safe navigation of the ship in the area being navigated, as complete, accurate, intelligible and up-to-date as the Canadian Government publication.

(3) No ship need use the List of Lights, Buoys and Fog Signals if the information contained in that publication that may affect the safe navigation of the ship is described on the charts used by the ship.

Maintenance.

7. Every ship shall ensure that any chart or publication required by this Part to be on board the ship is, before being used in the navigation of the ship, corrected up-to-date from information that may affect the safe navigation of the ship and that is contained in a notice to mariners or a radio navigation warning.

Exception.

8. Notwithstanding the provisions of this Part, a ship shall be deemed not to have contravened this Part if, before the ship navigated an area for which a chart or publication is required and after the ship was informed that it would be navigating that area, it was not possible for the ship

(a) to obtain the required chart or publication at any harbour at which the ship called;

(b) to obtain safely and legally the required chart or publication at any harbour that the ship passed at such a distance that it would not have been unreasonable for the ship to obtain the chart or publication at that harbour; or

(c) to receive a radio navigation warning containing information that may have affected the safe navigation of the ship in that area.

Part II–Canadian Ships in Waters Other Than Canadian Waters or Fishing Zones

Application.

9.(1) Subject to subsection (2), this Part applies to all self-propelled Canadian ships, other than ships of war, in waters other than

(a) Canadian waters;

(b) a shipping safety control zone prescribed pursuant to the Arctic Waters Pollution Prevention Act; and

(c) a fishing zone of Canada prescribed pursuant to the Territorial Sea and Fishing Zones Act.

(2) This Part does not apply to a ship that is of less than 100 tons, gross tonnage, if the person in charge of the navigation of that ship

(a) is informed of the location and character of charted

(i) shipping routes,

(ii) lights, buoys and marks, and

(iii) navigational hazards, and

(b) has a general knowledge of the prevailing navigational conditions in the area in which the ship is to be navigated.

Conflict of Laws.

10. In the event of any inconsistency between this Part and the laws of a country other than Canada that are applicable to a Canadian ship within its territorial waters or fishing zones, the laws of that country prevail to the extent of the inconsistency.

Responsibility of Owner and Master.

11. The owner and master of every ship to which this Part applies shall ensure that the ship complies with the requirements of this Part.

Carriage of Charts and Publications.

12. Every ship shall have on board, in respect of each area to be navigated by the ship, at least the latest editions of such charts and the most recent issues of such publications as are necessary for the ship to comply with sections 13 to 16.

Use of Charts.

13.(1) Subject to subsection (2), every ship shall, in respect of the immediate area in which the ship is located, make proper navigational use of a chart that

(a) is published by a national authority;

(b) covers that immediate area; and

(c) provides a representation of the area covered by the chart that is

(i) as complete, accurate, intelligible and up-to-date as, and

(ii) at a scale that is at least 75 per cent of the scale of the largest scale chart described in the chart catalogue specified in section 15 that is a chart of that immediate area.

(2) where a ship is located,

(a) more than five nautical miles from any charted feature or charted depth of water that represents a potential hazard to the ship, or

(b) within the area covered by a chart described in the chart catalogue specified in section 15 as a chart

(i) primarily intended for the use of pleasure craft, or

(ii) primarily of an anchorage, a river or a harbour that is not entered by the ship, paragraph (1)(c) shall be deemed to refer to the second largest scale chart of that immediate area as described in the chart catalogue specified in section 15, if that second largest scale chart is at a scale of not less than 1:400,000 (5.486 nautical miles to the inch or 2.160 nautical miles to the centimetre).

Use of Other Publications.

14.(1) Subject to subsections (2) and (3), every ship shall, in respect to each area to be navigated by the ship, make proper navigational use of

(a) the following publications described in the chart catalogue specified in section 15:

(i) tide and current tables;

(ii) sailing directions;

(iii) list of lights; and

(iv) where the ship is fitted with radio equipment, list of radio aids to marine navigation;

(b) the following Canadian Government publications:

(i) the annual edition of Notices to Mariners;

(ii) Code of Navigation Practices and Procedures; and

(iii) where the ship is making a voyage during which ice may be encountered, Ice Navigation in Canadian Waters; and

(c) the chart catalogue specified in section 15.

(2) A publication of any national authority may be substituted for any publication described in paragraph (1)(a) and subparagraphs (1)(b)(ii) and (iii) if the publication is, in respect of information that may affect the safe navigation of the ship in the area to be navigated; as complete, accurate, intelligible and up-to-date as the publication for which it is to be substituted.

(3) No ship need use the list of lights if the information contained in that publication that may affect the safe navigation of the ship is described on the charts used by the ship.

Chart Catalogue.

15. The most recent issue of the chart catalogue published by the Government of Great Britain, the United States or Canada, whichever one provides the most complete, accurate, intelligible and up-to-date navigational coverage for the territorial sea, fishing zone or region of the high sea that is to be navigated, shall be the chart catalogue used for the selection of charts and publications required by this Part.

Maintenance.

16. Every ship shall ensure that any chart or publication required by this Part to be on board the ship is, before being used in the navigation of the ship, corrected up-to-date from information that may affect the safe navigation of the ship and that is contained in a notice to mariners or a radio navigation warning.

Exception.

17. Notwithstanding the provisions of this Part, the owner or master of a ship shall be deemed not to have contravened this Part if, before the ship navigated an area for which a chart or publication is required and after the ship was informed that it would be navigating that area, it was not possible for the ship

(a) to obtain the required chart or publication at any harbour at which the ship called;

(b) to obtain safely and legally the required chart or publication at any harbour that the ship passed at such a distance that it would not have been unreasonable for the ship to obtain the chart or publication at that harbour; or

(c) to receive a radio navigation warning containing information that may have affected the safe navigation of the ship in that area.

3. THE GREAT LAKES

The Great Lakes system includes Lakes Ontario, Erie, Huron, Michigan, and Superior, their connecting waters, and the St. Lawrence River. It is one of the largest concentrations of fresh water on the earth. The system, including the St. Lawrence River above Iroquois Dam, has a total shoreline of about 11,000 miles, a total water surface area of about 95,000 square miles, and a total drainage basin of almost 300,000 square miles. With the opening of the St. Lawrence Seaway, the system provides access by oceangoing deep-draft vessels to the great industrial and agricultural heartland of the North American continent. From the Strait of Belle Isle at the mouth of the Gulf of St. Lawrence, the distance via the St. Lawrence River to Duluth, Minn., at the head of Lake Superior is about 2,340 miles and to Chicago, Ill., near the S end of Lake Michigan is about 2,250 miles. About 1,000 miles of each of these distances is below Montreal, the head of deep-draft ocean navigation on the St. Lawrence River.

Small craft and barge traffic may also reach the Great Lakes via two shallow-draft routes; from the Gulf of Mexico via the Mississippi River and the Illinois Waterway to Lake Michigan at Chicago, Ill., a distance of about 1,530 miles, and from New York Harbor via the Hudson River and the New York State Barge Canal System to Lake Ontario at Oswego, N.Y., a distance of 340 miles, or to the Niagara River at Tonawanda, N.Y., a distance of 496 miles.

The following table shows the controlling dimensions for these three routes and for other canals within the Great Lakes system.

The following limiting dimensions (in feet) are for each of the three routes described above and for canal navigation in the Great Lakes system:

***St. Lawrence River**–depth, 26; width, 76; length, 730; vertical clearance, 117.

Mississippi River-Illinois Waterway–depth, 9; width, 80; length, 600; vertical clearance, 17.

N.Y. State Canals-Hudson River to Oswego–depth, 13; width, 43.5; length, 300; vertical clearance, 20.

Hudson River to Whitehall, and from Three Rivers to Ithaca, Montour Falls, and Tonawanda–depth, 12; width, 43.5; length, 300; vertical clearance, 15.5.

Riviere Richelieu-Lake Champlain to St. Lawrence River–depth, 6½; width, 23.2; length, 111.4; vertical clearance, 29.

***Welland Canal**–depth, 26; width, 76; length, 730; vertical clearance, 117.

St. Marys Falls Canal (Soo Locks)–(See Limiting Dimensions of Through Channel, chapter 12, St. Marys River.)

*Minimum limiting measurements for transit of the entire Seaway by pleasure craft are a deadweight of 1 ton or 20 feet in overall length. These control factors are based on requirements for passage through the South Shore Canal, Beauharnois Canal, and the Welland Canal.

The **St. Lawrence Seaway** includes the waters of the St. Lawrence River above Montreal, Lake Ontario, the Welland Canal, and Lake Erie as far W as Long Point. The canals and locks of the Seaway overcome the rapids and water level differences in the St. Lawrence River between the ocean and Lake Ontario and between Lake Ontario and Lake Erie and enable deep-draft oceangoing vessels to proceed from the Atlantic Ocean to Lake Superior, the farthest inland major lake. The development, operation, and maintenance of the Seaway are under the joint control of The **Saint Lawrence Seaway Development Corporation,** a corporate agency of the United States, and The **St. Lawrence Seaway Authority of Canada**. The Corporation headquarters is in Washington, D.C., and the operational field headquarters is in Massena, N.Y. The Authority headquarters is in Ottawa, Ont., with field offices in Cornwall, St. Lambert, and St. Catharines. (See appendix for addresses.)

The Corporation and the Authority jointly publish the **Seaway Handbook,** which contains regulations issued by the respective governments and other information relating to operational requirements of vessels transiting the Seaway. The Handbook also contains a schedule of Seaway tolls. The regulations contained in the Handbook are also codified in 33 CFR 401. A copy of the regulations is required to be kept on board every vessel transiting the Seaway. (See **33 CFR 401**, chapter 2.)

The Corporation and the Authority each issue **Seaway Notices,** which contain information on changes in aids to navigation and other information relating to safety of navigation in the Seaway. The information contained in the notices is also broadcast by Seaway radio stations. The Seaway Notices are available at appropriate locks and canals and at the offices of the Seaway entities.

Aids to navigation in U.S. waters of the Seaway between St. Regis and the head of the St. Lawrence River are operated and maintained by The Saint Lawrence Seaway Development Corporation and are described in the U.S. Coast Guard Light List. Buoys off station, lights extinguished or malfunctioning, and other defective conditions should be reported promptly, by radio or other means, to the nearest Coast Guard unit or to Massena traffic control center via "Seaway Eisenhower" or "Seaway Clayton."

Vessel Traffic Services. –A Vessel Traffic Service (VTS) has been established in St. Marys River. The Service has been established to prevent collisions and groundings, to protect improvements to the waterway, and to protect the navigable waters from environmental harm.

The Vessel Traffic Service provides for a Vessel Traffic Center (VTC), voice call, "Soo Control," that may regulate the routing and movement of vessels by movement reports of vessels, specific reporting points, and VHF-FM radio communications. The Service includes one- and two-way traffic areas, areas of allowed and prohibited anchorage, and speed limits.

Participation in the Vessel Traffic Service (St. Marys River) is mandatory. (See **33 CFR 161.801 through 161.894,** chapter 2, for regulations affecting vessel operations in the Vessel Traffic Service, and chapter 12 for details.)

The Canadian Coast Guard operates a **Vessel Traffic Service (VTS)** in Canadian waters from Long Point in Lake Erie through the Detroit and St.Clair Rivers to De Tour Reef Light in Lake Huron. The service is mandatory from Detroit River East Outer Channel Lighted Buoy 1 and West Outer Channel Lighted Bell Buoy 1 to Lake Huron Cut Lighted Horn Buoy 11. The service is voluntary in the remaining waters. The service is designed to enhance the safe and expeditious movement of marine traffic by encouraging the monitoring of a common radio frequency by vessels within each sector of the service. The service provides users with information on traffic situations pertaining to no meeting zones, as well as information to pilots, the St. Lawrence Seaway Authority, the public, vessel owners, and shipping agents.

The service is divided into three traffic sectors, each with a specific operating frequency: **Sector 1,** VHF-FM channel 12 (156.60 MHz), the Canadian waters from Long Point Light in Lake Erie to Lake St. Clair Light in Lake St. Clair; **Sector 2,** VHF-FM channel 11 (156.55 MHz), the waters N of Lake St. Clair Light through the St. Clair River to latitude 43°10'N. in Lake Huron; **Sector 3,** VHF-FM channel 11 (156.55 MHz), the Canadian waters of Lake Huron from latitude 43°10'N. to De Tour Reef Light.

The VTS is administered by the VTS Center at Sarnia, Ont., at the head of the St. Clair River. The center is equipped with VHF transmitting and receiving facilities both locally and from remote sites. Participating vessels should report their name and ETA at the next calling-in point to the VTS Center and, on request, will receive all reported information on vessel traffic in their area. In the voluntary participation areas of the VTS, calling-in points are located in Lake Erie abeam Long Point Light and abeam Southeast Shoal Light and in Lake Huron at Latitude 43°10'N., abeam Harbor Beach Light or Point Clark Light, abeam Cove Island Light, abeam Great Duck Island Light, and abeam De Tour Reef Light. Calling-in points in the mandatory participation areas of the VTS are identical to those of the U.S. Coast Guard vessel traffic reporting system described in 33 CFR 162.30 through 162.40 (see chapter 2). (For complete information on the VTS, including calling-in points and message content, refer to the Annual Edition of Canadian Notices to Mariners.)

Mariners are cautioned that not all vessels navigating in the voluntary areas of the service may be participating. The service is in no way an attempt by the Canadian Coast Guard to regulate the navigation or maneuvering of vessels from a shore station. The VTS does not override the responsibility of the master for the safe navigation of his vessel in accordance with the Navigation Rules.

Navigation regulations.–The U.S. Coast Guard has established a **vessel traffic reporting system** and related navigation regulations for the connecting waters from Lake Erie to Lake Huron. The reporting system is operated through the Canadian Vessel Traffic Service Center at Sarnia, Ont. (See **33 CFR 162.130 through 162.140,** chapter 2, for complete information.)

Vessel Traffic Management.–A Vessel Traffic Management Contingency Plan (VTM) for the Detroit and St. Clair Rivers has been agreed upon by the United States Coast Guard and the Canadian Department of Transport. The purpose of the system is to enhance the safety of navigation in the rivers during periods of exceptionally hazardous navigation conditions and to protect the navigable waters of the rivers from environmental harm. These objectives are accomplished by establishing criteria for allowing vessels to transit the system, by managing vessel entries and transits of the system, and by establishing no passing zones as required. The system is implemented only in cases of emergency, upon agreement of the Commander, U.S. Coast Guard Ninth District, and the Director, Central Region, Canadian Department of Transport. The implementation will be promulgated through Broadcast Notice to Mariners.

This VTM system applies to all vessels 65 feet or over in length, all commercial vessels 26 feet or over in length when engaged in towing another vessel astern, alongside, or by pushing ahead, and each dredge or floating plant operating in the VTM area. Vessels in Sector 1 of the system, the Detroit River and Lake St. Clair S of Lake St. Clair Light, shall communicate with Detroit Vessel Traffic Center on VHF-FM channel 12 (156.60 MHz). Vessels in Sector 2, Lake St. Clair N of Lake St. Clair Light and St. Clair River, shall communicate with Sarnia Vessel Traffic Center on VHF-FM channel 11 (156.55 MHz). The secondary communications frequency for both sectors is VHF-FM channel 16 (156.80 MHz). Complete information on the system, including calling-in points and message content, is contained in the pamphlet Agreement on Vessel Traffic Management Contingency Plan for the Detroit and St. Clair Rivers, available from the U.S. Coast Guard Marine Safety Office in Detroit, Mich. (See appendix for address.)

Ports and Waterways Safety.–(See **33 CFR 160,** chapter 2, for regulations governing vessel operations and requirements for notifications of arrivals, departures, hazardous conditions, and certain dangerous cargoes to the Captain of the Port.)

Dump Sites and Dumping Grounds.–These areas are rarely mentioned in the Coast Pilot, but are shown on the nautical charts. (See Dump Sites and Dumping Grounds, chapter 1, and charts for limits.)

Potable Water Intakes.–Vessels operating on freshwater lakes or rivers including the Great Lakes and connecting waters shall not discharge sewage, ballast, or bilge water, within the restricted areas adjacent to potable water intakes as are designated by the Surgeon General of the United States. (See **21 CFR 1250.93,** chapter 2.)

Note.–This regulation, originally published under Title 42, Public Health, by the U.S. Public Health Service, is published in Title 21, Food and Drugs; cognizant agency, Food and Drug Administration.

The current list of restricted vessel waste discharge areas adjacent to potable (domestic) water intakes is contained in the Federal Register of September 16, 1960 (25 F.R. 8925). The areas were described and located by both geographical coordinates and by NOS Chart Numbers.

Except as otherwise specifically indicated in the above list, in each case the restricted area includes the water within a circle having a radius of 3 miles with the domestic water intake as its center, in no event, however, extending beyond the International boundary line with Canada.

This restriction applies to all vessels which are underway, moored, or anchored within the restricted areas subject to the following provisions:

1. Vessels moored at docks shall not discharge sewage, ballast or bilge water overboard if dock facilities for the disposal of such waste are available.
2. Vessels required to anchor within a restricted area under an emergency condition for the safety of the vessel are exempted.
3. Vessels which provide sewage or waste treatment approved by the . . . (Commissioner of Food and Drugs), are exempted from that portion of the restriction applicable to sewage.

The list of intakes and the extent of the restricted areas may be revised from time to time.

Danger zones have been established within the area of this Coast Pilot. (See **33 CFR 204,** chapter 2, for limits and regulations.)

Drawbridges.–The general regulations that apply to all drawbridges are given in **117.1 through 117.49,** chapter 2, and the specific regulations that apply only to certain drawbridges are given in **Part 117, Subpart B,** chapter 2. Where these regulations apply, references to them are made in the Coast Pilot under the name of the bridge or the waterway over which the bridge crosses.

The drawbridge opening signals (see **117.15,** chapter 2) have been standardized for most drawbridges within the United States. The opening signals for those few bridges that are nonstandard are given in the specific drawbridge regulations. The specific regulations also address matters such as restricted operating hours and required advance notice for openings.

The mariner should be acquainted with the general and specific regulations for drawbridges over waterways to be transited.

Fluctuations of water level.–The water levels of the Great Lakes are subject to three types of fluctuation: seasonal, long range, and short period. Seasonal or annual fluctuations cover a period of about 1 year, long range fluctuations a few or many years, and short period fluctuations from several minutes to a few days. Seasonal and long range fluctuations generally affect an entire lake, while short period fluctuations are local in scope.

The seasonal fluctuations are the most regular, with the highest levels usually occurring in summer and the lowest in winter. These fluctuations are caused by a number of factors that affect lake levels, including rain and snowfall, evaporation, ground water levels, and runoff from the land. From year to year, the magnitude of the fluctuation between the high and the low and the months in which these occur may vary considerably in an individual lake. Lake Superior is generally last to reach its seasonal low and seasonal high, in March and September, respectively. Lakes Michigan and Huron usually reach their low in February and their high in July. Lake Erie usually reaches its low in February and its high in June. Lake Ontario usually reaches its low in January and its high in June. The amount of fluctuation between the seasonal high and low is generally least in Lake Superior and most in Lake Ontario.

Long range fluctuations of the lake levels are caused by long term variations of the same factors which affect seasonal fluctuations. Precipitation is the most important of these factors. Long periods of above or below normal rain and snowfall are usually followed by higher or lower lake levels, but this effect may be increased or decreased by combination with the other factors that affect lake level. Another cause of long range fluctuations is the uplifting of the earth's crust in the Great Lakes region. When the outlet of the lake is rising in relation to the lake shores, the water level rises with respect to the land. This effect is occurring in all the lakes, except for parts of the NE shores of Lake Superior and Lake Huron.

Short period fluctuations occur in amounts varying from a few inches to several feet and for periods varying from a few minutes to a day, depending on the locality where they occur. These fluctuations are caused by winds, by sudden barometric pressure changes, and by oscillations called seiches, which may be caused by one or both of the other two. Sustained winds drive forward a greater volume of surface water than can be carried off by the subsurface return currents, thus raising the water level on the lee shore and lowering it on the windward shore. This effect is more pronounced in bays and at the extremities of the lakes, where the impelled water is concentrated in a small space by converging shores, especially if coupled with a gradually sloping inshore bottom which even further reduces the flow of the lower return currents. Closely spaced high and low barometric pressure centers moving across a lake cause a temporary tilting of the water surface. The amount of this tilting is dependent on the pressure gradient and the speed of the moving centers. **Seiche** (pronounced saych) is an oscillation that occurs when winds and/or barometric pressure differences causing a fluctuation have diminished. The lake surface is in a tilted condition, and a surge of water takes place from the high area to the low. An imbalance in the opposite direction occurs and causes a return surge. This effect continues, with each successive surge diminished by friction until the seiching action ceases.

Lunar tides are known to exist on the Great Lakes, particularly on those lakes with an E and W axis. However, the effects of these tides are so small as to be inconsequential when compared to the effects of other short period fluctuations. (See the appendix for a list of water level publications published by NOS and the Corps of Engineers.)

Weather.–Climatological tables for coastal localities covered in this volume follow the appendix. Listed in the appendix are National Weather Service offices and radio stations which transmit weather information.

Storm warning display locations are listed on the NOS charts and shown on the Marine Weather Services Charts published by the National Weather Service. The Marine Weather Services Charts, which contain additional important information, are available from Distribution Branch (N/CG33), National Ocean Service. (See appendix for address.)

This section presents an overall, seasonal picture of the weather that can be expected on the Great Lakes. Detailed local weather is discussed in the appropriate chapters.

Weather can make navigating the Great Lakes a pleasure, a challenge, or a terror. Each season has its own weather problems, each waterway its own peculiarities.

Winter navigation is severely restricted by ice and storms. Ice coverage and thickness vary from lake to lake and season to season. Seaway shipping is usually at a standstill from mid-December through early April. Great Lakes shipping extends into the winter but depends upon local conditions. The ice threat is compounded by fierce winter storms which bring a variety of wind, wave, and weather problems on an average of every 4 days. A combination of strong winds, rough seas, and cold temperatures can result in superstructure icing, in which sea spray and sometimes precipitation can freeze to a ship's superstructure. This adds tremendous weight and creates dangerous instability.

Spring storms can generate gales and rough seas, but with the approach of summer they become less frequent and severe. Fog is the principal navigational headache. Relatively warm water pumped over still cold lake waters creates an advection fog that plagues the mariner into the summer. In late spring, thunderstorms become an occasional problem.

While fog can hinder navigation and an occasional low-pressure system can bring a spell of bad weather, this is usually the most troublefree time. The principal threat is the thunderstorm. While they can occur in any month, they are most likely from May through October. They can spring up quickly and generate strong winds and rough seas.

Autumn is dangerous. Clear, crisp days are often interrupted by rapidly intensifying low-pressure systems whose gale-force winds can whip tumultuous seas. Energy is supplied by the still warm waters, and contrasting air masses can spawn storms right over the Great Lakes Basin. Occasionally, an errant tropical cyclone makes its way into the region. Fog can be a local, generally nearshore, problem on calm, clear nights. It usually lifts shortly after sunrise.

Extratropical Cyclones.–The Great Lakes lie in the midst of a climatological battlefield, where northern polar air often struggles for control with air from the Tropics. During spring and autumn, the zone separating these two armies lies over the Lakes region. The contrast between the two triggers the formation of a number of low-pressure systems, often intense, often fast moving. The Lakes provide moisture and, in the fall, heat to fuel these winter-type storms. They also aid storms that migrate from other regions.

The more destructive storms usually come from the SW or W. Lows spawned in the Pacific southwest, Arizona-New Mexico, and the central Rocky Mountain and Great Plains States account for nearly half of the storms that enter the Great Lakes Basin from October through May. Another source is western Canada, which spawns the **"Alberta Lows."** At a peak in October, these storms arrive from the W and NW. They are relatively weak and rarely generate gales; however, occasionally one has been known to kick up 60-knot winds after intensifying over friendly waters.

When a ship is S of an eastward-moving storm center, the approach of the low is heralded by a falling barometer, a SE to S wind, lowering clouds, and drizzle, rain, or snow. Precipitation diminishes and the wind veers as the warm front nears. In the warm sector, temperatures rise, skies brighten, and the air is humid with haze or fog. The passage of the cold front is marked by a bank of convective clouds to the W, a sharp veering of the wind to the W or NW, and sometimes sudden squalls with showers or thunderstorms. Behind the cold front, pressure rises, temperatures fall, visibility increases, and cloud cover decreases.

When a ship is N of the storm center, changes in the weather are less rapid and less distinctive than when sailing S of the center. Winds ahead of the low gradually back from the E through N to NW. The weather conditions also vary, gradually shifting from those found in advance of the warm front to those behind the cold front.

Thunderstorms.–While they can develop in any month, thunderstorms are most likely from May through October. They can occur in squall lines or a single cell. They can stir a breeze or kick up gusts of 100 knots. They can spring up rapidly or be tracked for several days. They can bring a gentle shower or harbor a tornado or waterspout. They can create serious problems for the Great Lakes mariner. The number of days with thunderstorms can vary from year to year, but on the average they can be expected on 5 to 10 days per month during the summer. The Lakes themselves can influence this frequency. Cool water and a strong lake breeze both inhibit summertime convective activity over water. For example, Lake Michigan suppresses thunderstorm activity during the summer, but increases it slightly in autumn. Along the shore, activity is most likely in the afternoon and evening, while over open waters it is more likely at night.

Fog.–Fog can form in any season, but it is most likely in spring and early summer, particularly over open waters. Along the shore, fog is also common in autumn. Occasionally, steam fog will develop during the winter. The densest and most widespread fog is the advection type, where relatively warm air flows over cooler water. These conditions exist in spring and summer. Fog is particularly tenacious over the NW portions of the lakes, where the cold water is continually brought to the surface by upwelling. This fog is often persistent. It may lift somewhat during the day, but unless broken up by a good wind, will lower again during the night. Radiation fog is formed by the air in contact with a rapidly cooling land surface, such as occurs on clear, calm autumn nights. This fog forms onshore and may drift out over the lakes during the early morning. It is usually not as dense nor persistent as advection fog and should lift by noon. Steam fog or arctic sea smoke occurs when frigid arctic air moves across the lakes and picks up enough moisture to become saturated. This fog may vary from 5 to 5,000 feet in depth, although it is seldom very dense.

Ice.–Ice begins to form slowly, usually in early November, in the shallows, coves, and inlets. Gradually it spreads and thickens, building out from the shore and breaking off. Since during most winters the period of freezing temperatures is not long enough to cause a lakewide solid ice sheet to form, most lakes are besieged by "pack ice," which, in its broadest sense, is any ice that is not fast ice. This pack ice is then susceptible to the whims of winds, waves, and currents. This can cause rapid changes in a real coverage, which make predictions of thickness, extent, and distribution difficult.

The ice that builds out from the shore ranges from a few inches to several feet in thickness. Much of it breaks off to form floes and fields. Strong persistent winds cause windrows and pressure ridges to form. Some of these may extend 10 to 20 feet above the ater and 30 to 35 feet below, anchoring themselves o the lake bottom. Pack slush ice, which is pack ice hat is well broken up, is particularly harzardous to hipping. It is difficult to combat as it quickly closes n around a vessel, preventing movement in any direction. It can damage propellers and steering gear, clog condenser intakes, and exert tremendous pressure on the hull.

Ice is often strong enough to halt navigation through the St. Lawrence Seaway by mid-December. The Seaway usually reopens by mid-April. Inter- and intra-lake shipping usually continues well into January with the help of icebreakers. A few channels remain open all season. Ice cover peaks in late February or early March. Soon the decay begins. By April, shipping is in full swing; however, some drift ice remains into May.

Cargo Care.–High humidities and temperature extremes that can be encountered when navigating the Great Lakes may cause sweat damage to cargo. This problem is most likely when cargoes are loaded in warm summer air or can occur anytime temperatures fluctuate rapidly.

When free air has a higher dewpoint than the temperature of the surface with which it comes in contact, the air is often cooled sufficiently below its dewpoint to release moisture. When this happens, condensation will occur aboard ship either on relatively cool cargo or on the ship's structure within the hold, where it drips onto the cargo. If cargo is stowed in a cool climate and the vessel sails into warmer waters, ventilation of the hold with outside air can lead to sweat damage of any moisture-sensitive cargo. Unless the cargo generates internal heat, then, as a rule, external ventilation should be shut off. When a vessel is loaded in a warm weather region and moves into a cooler region, vulnerable cargo should be ventilated.

In general, whenever accurate readings show the outside air has a dewpoint below the dewpoint of the air surrounding the vulnerable cargo, such outside air is capable of removing moisture and ventilation may be started. However, if the outside dewpoint is higher than the dewpoint around the cargo, ventilation will increase moisture and result in sweating. This generally does not take into account the possibility of necessary venting for gases or fumes.

Optical Phenomena.–The two basic types of optical phenomena are those associated with electromagnetic displays and those associated with the refraction or diffraction of light. The **aurora** and **Saint Elmo's fire** are electromagnetic displays. Halos, coronas, parhelia, sun pillars, and related effects are optical phenomena associated with the refraction and diffraction of light through suspended cloud particles; mirages, looming, and twilight phenomena such as the "**green flash**" are optical phenomena associated with the refraction of light through air of varying density. Occasionally, sunlight is refracted simultaneously by cloud suspensions and by dense layers of air producing complex symmetric patterns of light around the sun.

A **mirage** is caused by refraction of light rays in a layer of air having rapidly increasing or decreasing density near the surface. A marked decrease in the density of the air with increasing altitude is the cause of such phenomena known as looming, towering, and superior mirages. Looming is said to occur

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when objects appear to rise above their true elevation. Objects below the horizon may actually be brought into view. Towering has the effect of elongating visible objects in the vertical direction. A superior mirage is so named because of the appearance of an image above the actual object. Ships have been seen with an inverted image above and an upright image floating above that.

Such mirages, especially with looming and towering, are fairly common in the area, with frequency increasing toward the higher latitudes. They are most common in summer when the necessary temperature conditions are most likely. Another type, the inferior mirage, occurs principally over heated land surfaces such as deserts, but may be observed occasionally in shallow coastal waters, where objects are sometimes distorted beyond recognition. In contrast to the superior mirage, the condition necessary for the inferior mirage is an increasing air density with height. Atmospheric zones of varying densities and thicknesses may combine the effects of the various types of mirages to form a complicated mirage system known as **Fata Morgana.**

The green flash is caused by refractive separation of the sun's rays into its spectral components. This may occur at sunrise or sunset when only a small rim of the sun is visible. When refractive conditions are suitable, red, orange, and yellow waves of sunlight are not refracted sufficiently to reach the eye, whereas green waves are. The visual result is a green flash in the surrounding sky.

The refraction of light by ice crystals may result in many varieties of halos and arcs. Because red light is refracted the least, the inner ring of the halo is always red with the other colors of the spectrum following outward. Halos with radii of 22° and 46° have been observed with the refraction angle within the ice spicules determining which type may occur.

Solar and lunar coronas consist of a series of rainbow-colored rings around the sun or moon. Such coronas resemble halos but differ in having a reverse sequence of the spectrum colors, red being the color of the outer ring, and in having smaller and variable radii. This reversed sequence of the spectrum occurs because coronas result from diffraction of light whereas the halo is a refraction phenomenon. The radius varies inversely as the size of the water droplets. Another type of diffraction phenomenon is the **Brocken bow** (also known as **glory**), which consists of colored rings around shadows projected against fog or cloud droplets.

Ice blink, land blink, and water and land skies are reflection phenomena observed on the underside of cloud surfaces. Ice blink is a white or yellowish-white glare on the clouds above accumulations of ice. Land blink is a yellowish glare observed on the underside of clouds over snow-covered land. Over open water and bared land, the underside of the cloud cover when observed to be relatively dark is known as water sky and land sky. The pattern formed by these reflections on the lower side of the cloud surfaces is known as "sky map."

Auroral displays are prevalent throughout the year, but are observed most frequently in the winter. Records show that the periods of maximum auroral activity coincide in general with the periods of maximum sunspot activity.

The cloudlike, luminous glow is the most common of the auroral forms. The arc generally has a faint, nebulous, whitish appearance and is the most persistent of the auroras. Ray auroras are more spectacular but less persistent phenomena. They are usually characterized by colored streaks of light that vary in color and intensity, depending on altitude. Green is the most commonly observed hue, although red and violet may occur in the same display. The **aurora borealis** (northern lights) may be observed on occasion.

Saint Elmo's fire is observed more rarely than the aurora and may occur anywhere in the troposphere. It occurs when static electricity collects in sufficiently large charges around the tips of pointed objects to ionize the air in its vicinity and leak off in faintly luminescent discharges. Saint Elmo's fire is observed occasionally on ship masts and on airplane wings in the vicinity of severe storms. It is described either as a weird, greenish glow or as thousands of tiny electrical sparks flickering along the sharp edges of discharging surfaces.

Winter Navigation.–Ice normally begins to form in various parts of the Great Lakes during December and forms a hazard to navigation by the end of the month. Before the St. Lawrence Seaway closes in late December, most lake vessels lay up for the winter and oceangoing vessels transit the Seaway to the Atlantic. Historically, weather and ice conditions have necessitated the suspension of shipping in the lakes from about mid-December until early April.

The River and Harbor Act of 1970 authorized a Federally funded Winter Navigation Program for the Great Lakes and the St. Lawrence Seaway. The program, part study and part demonstration, is designed to determine the feasibility of an extended navigation season. The demonstration program includes ship voyages extending beyond the normal navigation season, observation and surveillance of ice conditions and ice forces, environmental and ecological investigations, collection of technical data relating to improved vessel design, ice control facilities and aids to navigation, physical model studies, and coordination of the collection and dissemination of weather and ice information to vessels.

Overall planning, programming, budgeting, and approval for execution and reporting of program activities is provided by the Winter Navigation Board, comprised of senior field representatives of several Federal agencies and interested maritime organizations including the Corps of Engineers, U.S. Coast Guard, Saint Lawrence Seaway Development Corporation, Maritime Administration, Federal Power Commision, Department of the Interior, Great Lakes Basin Commission, Great Lakes Commission, National Oceanic and Atmospheric Administration, and the Environmental Protection Agency.

During the ice season, U.S. Coast Guard icebreakers, sometimes working in conjunction with Canadian Coast Guard icebreakers, conduct operations to maintain a broken track along the main vessel routes through the lakes, St. Marys River, and the Detroit-St. Clair River system and to assist vessels in transit as necessary. Floating aids to navigation, except those designated in the Coast Guard Light List as winter markers, are withdrawn from service immediately prior to the formation of ice on the lakes.

An **Ice Navigation Center** is operated by the U.S. Coast Guard from the Ninth Coast Guard District Office, Cleveland, each year from about December 1 until ice is no longer a hindrance to a commercial navigation on the Great Lakes. The primary function of the center is the collection of Great Lakes ice information from all available sources and the dissemination of this information to merchant vessels, other Coast Guard units, and other users. The center also keeps abreast of movements of merchant vessels and Coast Guard icebreakers, schedules Coast Guard ice reconnaissance, and validates and transmits information from remote sensing devices to Coast Guard shore stations for broadcast to merchant vessels.

The Ice Navigation Center disseminates information in several forms. Ice Summaries, issued two or three times per week, are mailed to vessel agents and teletyped to Coast Guard shore stations. Ice Forecasts and Ice Outlooks, issued by the National Weather Service, are relayed by the center for scheduled broadcasts made by various Coast Guard units. Ice Charts, showing ice coverage and thickness, are available for inspection at Coast Guard Group Offices in Detroit, Milwaukee, Duluth, and Buffalo for their local areas and may be obtained at the Sault Ste. Marie locks for the entire Great Lakes. Facsimiles of these charts are broadcast by Lorain Electronics. Wind and Temperature Forecast Charts are broadcast by Lorain Electronics following their Lake Weather Broadcasts (LAWEBs) and are also broadcast as facsimiles.

A large fixed-wing Coast Guard aircraft equipped with Side-Looking Airborne Radar (SLAR) obtains real-time microwave images of Great Lakes ice on a regular basis. These images are transmitted via satellite and landline to the Ice Navigation Center where they are annotated with additional data such as thickness and type. After annotation, facsimiles of the combined images are broadcast to vessels from commercial marine radio stations.

The Coast Guard operates a VHF-FM radiotelephone vessel traffic reporting system on Lakes Superior, Michigan, Huron, Erie, and the St. Marys River. The system is designed to provide vessel traffic information, aid in the efficient deployment of icebreaking services, and obtain ice information from transiting vessels. Vessels are requested to contact the appropriate Coast Guard Task Group prior to or upon departure from port, upon arrival at their destination, and at specified calling-in points between.

Complete information on the Ice Navigation Center and the vessel reporting system, including information broadcast schedules, icebreaking operations, general ice conditions, vessel report calling-in points, and message content, is contained in the joint United States and Canadian Coast Guard publication Guide to Great Lakes Ice Navigation.

The Canadian Coast Guard also operates a vessel traffic reporting system designed to provide traffic information to meet the requirements of the St. Lawrence Seaway Authority and the Vessel Traffic Service Center at Sarnia, Ont. Traffic information so obtained during the ice season is forwarded to Ice Toronto, the Canadian Coast Guard ice operations office in Toronto, Ont. This office provides current ice information, routing advice, information on aids to navigation, icebreaker support when available and considered necessary, and coordinates the formation of convoys when conditions dictate. Complete information on Ice Toronto and its services are contained in the Guide to Great Lakes Ice Navigation.

Routes.–The Lake Carriers Association and the Dominion Marine Association have prescribed, for vessels enrolled in the associations, separation routes for upbound and downbound vessels on the Great Lakes and connecting waterways. These routes are shown on the Great Lakes charts published by the National Ocean Service and are described in this Coast Pilot at the beginning of each affected chapter.

Pilotage.–By International agreement between the United States and Canada, the waters of the Great Lakes and the St. Lawrence River have been divided into designated and undesignated waters for pilotage purposes. In designated waters, registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. In undesignated waters, registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great Lakes undesignated waters.

The designated waters of the Great Lakes are divided into three districts as follows:

District 1, all waters of the St. Lawrence River between the International boundary at St. Regis, Que., and a line at the head of the river running from Carruthers Point Front Range Light, Kingston, Ont., on a bearing of about 127° true through Wolfe Island South Side Light extended to the New York shore;

District 2, all waters of Lake Erie W of a line on a bearing of about 026° true from Sandusky Harbor Pierhead Light at Cedar Point, Ohio, to Southeast Shoal Light; the waters contained within the area of a circle of 1 mile radius E of Sandusky Harbor Pierhead Light; the Detroit River; Lake St. Clair; the St. Clair River and the N approaches thereto S of latitude 43°05'30"N.; the Welland Canal which includes waters of the canal in the S approach within an arc drawn 1 mile to the S of the outer light on the W breakwater at Port Colborne, and in the N approach within an arc drawn 1 mile to the N of the W breakwater light at Port Weller; and

District 3, all waters of the St. Marys River, Sault Ste. Marie locks, and approaches thereto between latitude 45°59'N. at the S approach and longitude 84°33'W. at the N approach.

Undesignated waters are all waters of the Great Lakes other than designated waters. For purposes of pilotage, Great Lakes means Lakes Superior, Michigan, Huron, Erie, and Ontario, their connecting and tributary waters and the St. Lawrence River above St. Regis, and adjacent port areas.

Oceangoing vessels entering the St. Lawrence River from sea make arrangements for pilotage service in advance through ships' agents. For vessels already on the Great Lakes that require pilotage service, the nearest pilot dispatch office is notified 12 hours ahead with a follow-up confirmation 4 hours in advance.

The various regions of the Great Lakes are served by several associations of United States and Canadian registered pilots. The associations and their service areas are as follows: Laurentian Pilotage Authority, St. Lawrence River below the lower entrance to St. Lambert Lock at Montreal; Great Lakes Pilotage Authority, Ltd., Cornwall, and St. Lawrence Seaway Pilots Association, St. Lawrence River above the lower entrance to St. Lambert Lock at Montreal; Great Lakes Pilotage Authority, Ltd., St. Catharines, Lake Ontario, Welland Canal, and Lake Erie; Lakes Pilots Association, Lake Erie, Detroit River, and St. Clair River; Upper Great Lakes Pilots, Inc., Lake Huron, Lake Michigan, St. Marys River, and Lake Superior. (See appendix for dispatch office addresses and telephone numbers.)

Pilot exchange points are at St. Lambert Lock at Montreal; at Beauharnois Lock; at Snell Lock; off Cape Vincent, N.Y., at the head of the St. Lawrence River; 1 to 2 miles N of Port Weller; 1 to 2 miles S of Port Colborne; just below the Ambassador Bridge in the Detroit River; off Port Huron at the head of St. Clair River in about 43°05'30"N., 82°24'42"W.; at De Tour, Mich., at the mouth of St. Marys River; and at the head of St. Marys River about 3.5 miles SE of Point Iroquois.

Towage.–Tugs are available at most of the major ports; they can usually be obtained for the smaller ports on advance notice if none are available locally. Arrangements for tugs should be made in advance through the ships' agents or the pilots. See the text for the ports concerned as to the availability of tugs.

Vessel Arrival Inspections.–Quarantine, customs, immigration, and agricultural quarantine officials are stationed in most major U.S. ports. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents. Unless otherwise directed, officials usually board vessels at their berths.

Harbormasters are appointed for some of the principal ports. They have charge of enforcing harbor regulations, and in some instances are in charge of the anchorage and berthing of vessels.

Search and Rescue Telephone Number.–(See this topic, chapter 1.)

Small-craft regulations, State of Michigan.–The Marine Safety Act, Act No. 303, Public Acts of 1967, Michigan Compiled Laws states, in part:

A person operating or propelling a vessel upon the waters of this State shall operate it in a careful and prudent manner and at such a rate of speed so as not to endanger unreasonably the life or property of any person. A person shall not operate any vessel at a rate of speed greater than will permit him, in the exercise of reasonable care, to bring the vessel to a stop within the assured clear distance ahead. A person shall not operate a vessel in a manner so as to interfere unreasonably with the lawful use by others of any waters.

Persons operating vessels on the waters of this State shall maintain a distance of 100 feet from any dock, raft, buoyed or occupied bathing area, or vessel moored or at anchor, except when the vessel is proceeding at a slow-no wake speed or when water skiers are being picked up or dropped off, if such operation is otherwise conducted with due regard to the safety of persons and property and in accordance with the laws of this State.

For purposes of this act, "Slow-no wake speed" means a very slow speed whereby the wake or wash created by the vessel would be minimal.

Additional information and free copies of Act 303 are available from the State of Michigan, Department of Natural Resources, Marine Safety Section, Stevens T. Mason Building, Lansing, Mich. 48926; telephone, 517-373-1650.

In addition to the Marine Safety Act, the Law Enforcement Division of the Michigan Department of Natural Resources, in cooperation with local units of government, has established Special Local Watercraft Controls. These controls have been established in the interest of safety and to resolve conflicts of interest involving waterway usage. Speed limits contained in these regulations are described in the text. Copies of the controls are available from the Law Enforcement Division, Department of Natual Resources, Box 30028, Lansing, Mich. 48909.

Small-craft harbors of refuge, State of Michigan.–The Michigan State Waterways Commission, in conjunction with local municipalities, has constructed a series of small-craft harbors of refuge along the Michigan shorelines. The harbors are usually no more than 20 miles apart except on Lake Superior where they may be as much as 40 miles apart. The harbors, most of which are manned during the summer and equipped with VHF-FM channel 16 (156.80 MHz), provide dockage and usually some services. These facilities are discussed in the text under **Small-craft facilities.**

Standard time.–The area covered by this Coast

Pilot is in two time zones, **Eastern standard time** and **Central standard time.**

The boundary between Eastern standard time and Central standard time in the Great Lakes commences at the Lake Michigan shoreline intersection of the States of Michigan and Indiana, follows the northern boundary (which is offshore in Lake Michigan) of Indiana W to the W boundary (offshore in Lake Michigan) of Michigan, thence N along the Wisconsin-Michigan boundary (about midlake of Lake Michigan) to a point in about 45°15.2'N., 86°15.1'W., thence W along the Michigan-Wisconsin offshore boundary, passing between Rock Island, Wisc. and St. Martin Island, Mich., into Green Bay, thence to the Michigan shoreline in about 45°32.0'N., 87°16.2'W. (about 10 miles N of the mouth of Cedar River), thence along political boundaries (counties) to the Lake Superior shore of Michigan at about longitude 89°50.4'W. (about 10.3 miles NE of the mouth of Black River.) The boundary now proceeds W along the Michigan shore with the lakeshore areas within the Central standard time zone and the waters offshore within Eastern standard time zone to the Lake Superior shoreline intersection of the State boundary between Michigan and Wisconsin, thence about 024° following the offshore W boundary of the State of Michigan, crossing Lake Superior to the mouth of Pigeon River, the International boundary.

Thus Eastern standard time (e.s.t.) is observed by the State of Michigan (except as noted below), the areas E of it, and the lakeshore areas of the Canadian Province of Ontario. Eastern standard time is 5 hours slow of Greenwich mean time (G.m.t.). Example: when it is 1000 at Greenwich it is 0500 at Detroit, Mich.

Central standard time (c.s.t.) is observed in the Lake Michigan lakeshore areas of Indiana, Illinois, and Wisconsin, and the State of Michigan lakeshore areas on the W side of Lake Michigan as far N as about 10 miles N of the mouth of Cedar River. Now proceed to the N shore of Michigan's Upper Peninsular. Central standard time is observed from about 10 miles NE of Black River W to and through the lakeshore areas of Wisconsin and Minnesota. Central standard time is 6 hours slow of Greenwich mean time (G.m.t.). Example: when it is 1000 at Greenwich it is 0400 at Chicago, Ill.

Daylight saving time.–Throughout the area of this Coast Pilot, clocks are advanced 1 hour on the last Sunday in April and are set back to standard time on the last Sunday in October.

Legal public holidays.–The following are legal public holidays in the U.S. areas covered by this Coast Pilot: New Year's Day, January 1; Martin Luther King, Jr.'s Birthday, third Monday in January; Washington's Birthday, third Monday in February; Memorial Day, last Monday in May; Independence Day, July 4; Labor Day, first Monday in September; Columbus Day, second Monday in October; Veterans Day, November 11; Thanksgiving Day, fourth Thursday in November; and Christmas Day, December 25. The national holidays are observed by employees of the Federal Government and the District of Columbia, and may not be observed by all the States in every case.

Other holidays observed in the area of this Coast Pilot are: Martin Luther King Day, January 15 in Illinois, third Sunday in January in New York, and third Monday in January in Ohio; Lincoln's Birthday, February 12, Illinois, Indiana, Michigan, New York, Pennsylvania, and Vermont; Washington-Lincoln Day, third Monday in February, Ohio and Wisconsin; Town Meeting Day, first Tuesday in March, Vermont; Good Friday, Indiana and Wisconsin; Verrazano Day, April 7, New York; Minnesota Day, May 11, Minnesota; Flag Day, June 14 in Pennsylvania and second Sunday in June in New York; Bennington Battle Day, August 16, Vermont; Senior Citizens Day, fourth Sunday in September, Indiana; Francis Willard Day, September 28, Minnesota; Leif Ericson Day, October 9, Minnesota; General Pulaski Memorial Day, October 11, Indiana; and General Election Day, first Tuesday after the first Monday in November, Illinois, Indiana, New York, Pennsylvania, and Wisconsin.

Holidays observed in the Canadian areas covered by this Coast Pilot are: New Years Day, January 1; Good Friday; Easter Monday; Victoria Day, Monday preceding May 25; Dominion Day, July 1; Civic Holiday, first Monday in August; Labor Day, first Monday in September; Thanksgiving Day, second Monday in October; Remembrance Day, November 11; Christmas Day, December 25; and Boxing Day, December 26.

4. ST. LAWRENCE RIVER ABOVE ST. REGIS

The St. Lawrence River, 744 miles long, is one of the principal rivers of North America and provides access for oceangoing vessels to the Great Lakes and the great industrial and agricultural heartland of the continent. The river flows NE from its head in Lake Ontario, first along the United States-Canadian border, thence through the S part of Quebec Province past the cities of Montreal and Quebec before emptying into the Gulf of St. Lawrence. In its upper part, the river is wide and is filled with the Thousand Islands. Below Cornwall, Ont., the river widens into Lake St. Francis, thence into Lake St. Louis, thence descends through Lachine Rapids to Montreal. Lake St. Peter, another widened section, is between Sorel and Trois Rivieres. Below the city of Quebec, the river is a tidal estuary which gradually increases to a width of 90 miles at the mouth.

This chapter describes the upper part of the river, from St. Regis, Que., upstream to Lake Ontario. No attempt has been made to mention all of the islands, shoals, winding channels, and irregularities of the mainland shores which characterize the river for most of its length. Mariners are referred to the charts for delineation of the intricate details of topography and hydrography.

That part of the St. Lawrence River from Montreal upstream to Lake Ontario is part of the St. Lawrence Seaway and is under the navigational control of the Saint Lawrence Seaway Development Corporation, a corporate agency of the United States, and the St. Lawrence Seaway Authority of Canada. These agencies issue joint regulations covering vessels and persons using the Seaway. The regulations are codified in **33 CFR 401** and are also contained in the Seaway Handbook, published jointly by the agencies. A copy of the regulations is required to be kept on board every vessel transiting the Seaway. A schedule of the Seaway tolls is contained in the handbook. (See St. Lawrence Seaway, chapter 3, and **33 CFR 401,** chapter 2.)

Vessel traffic control.–The Seaway portion of the St. Lawrence River is divided into four traffic control sectors, with vessel movements in each sector controlled by a traffic controller. The objective of the system is to provide safe and efficient scheduling of vessel traffic, efficient search and rescue coverage, information regarding pilot requirements to the pilot dispatch centers, marine weather broadcasts, and information on vessel location to all interested parties.

The traffic control sectors in the St. Lawrence River are as follows: Sector 1, from Montreal to about midlength of Lake St. Francis; Sector 2, from midlength of Lake St. Francis to Bradford Island; Sector 3, from Bradford Island to Crossover Island; and Sector 4, from Crossover Island to midlake in Lake Ontario.

St. Lambert traffic control center controls traffic in Sector 1 through "Seaway Beauharnois," VHF-FM channel 14 (156.70 MHz), and in Sector 3 through "Seaway Iroquois," VHF-FM channel 11 (156.55 MHz). Massena traffic control center controls traffic in Sector 2 through "Seaway Eisenhower," VHF-FM channel 12 (156.60 MHz), and in the St. Lawrence River portion of Sector 4 through "Seaway Clayton," VHF-FM channel 13 (156.65 MHz). Complete information on the traffic control sectors and their respective calling-in points is contained in the Seaway Handbook.

Channels.–The main vessel course through the river has been improved by dredging, and canals and locks have been constructed to bypass the rapids and to overcome the water level difference between the ocean and Lake Ontario. The controlling depth in the channels of the St. Lawrence Seaway through the river is 27 feet.

The maximum permissible draft in the Seaway is 26 feet. The loading, draft, and speed of a vessel in transit shall be controlled by the vessel master according to the vessel's individual characteristics and its tendency to list or squat, so as not to strike bottom. The draft shall not in any case exceed the maximum permissible draft, which will be strictly enforced. Where a vessel's draft is in excess of the maximum permissible draft, the vessel will be delayed and the overdraft corrected before transit. The maximum permissible draft in any channel is subject to change should conditions so warrant. (For current information on permissible drafts through the St. Lawrence Seaway, consult the Seaway Notices.)

The maximum overall length and extreme breadth authorized in the Seaway locks is 730 feet and 76 feet, respectively. The maximum height authorized in the Seaway is 116½ feet above the water. (For complete information on vessel dimension restrictions, refer to the Seaway Handbook, and for supplemental information, to the Seaway Notices.)

Speed restrictions.–The St. Lawrence Seaway waters of the St. Lawrence River are a controlled speed area. The speed limits in U.S. waters are in accordance with **33 CFR 401.** (See chapter 2.)

The maximum speeds for vessels in excess of 40 feet in length are in effect in the following areas unless otherwise indicated through Seaway Notices:

Upper Entrance South Shore Canal to Lake St. Louis (Buoy A13), 10.5 knots;

Lake St. Louis (Buoy A13) to Lower Entrance Lower Beauharnois Lock, 16 knots;

Upper Entrance Upper Beauharnois Lock to Lake St. Francis (Buoy D3), 9 knots upbound and 10.5 knots downbound; Lake St. Francis (Buoy D3) to Lake St. Francis (Buoy D49), 16 knots;

Lake St. Francis (Buoy D49) to Snell Lock, 8.5 knots upbound, and 10.5 knots downbound;

Structures across the St. Lawrence River

Miles above Quebec Bridge

*****Clear width in feet proceeding upstream***

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above water datum*		*Remarks*
				Right	*Left*	*Center*	*Low*	*High*	
1	Quebec Bridge	Highway & Railroad	0.0			760		150	Fixed.
2	Overhead cables	Power	0.1					158	
3	Pierre Laporte Bridge	Highway	0.1					150	Fixed.
4	Overhead cables	Power	0.3					170	
5	Overhead cables	Power	73.7					160	
6	Laviolette Bridge	Highway	74.5					150	Fixed.
7	Overhead cables	Power	109.0				166		
8	Overhead cables	Power	142.1				165		
9	Overhead cable	Power	147.6				165		
10	Jacques Cartier Bridge	Highway	152.0			200	120		Fixed.
11	Overhead cables	Power	153.7				210		
12	Victoria Bridge	Highway & Railroad	153.8			80	120		Vertical lift.
	Lambert Lock		153.9						
13	Victoria Diversion bridge	Highway & Railroad	154.0			80	120		Vertical lift.
14	Champlain Bridge	Highway	155.8			300	120		Fixed.
	Cote St. Catherine Lock		162.2						
15	Cote St. Catherine Bridge	Highway	162.3			80			Rolling lift.
16	Overhead cables		165.0				120		
17	Overhead cables		165.2				120		
18	Overhead cables		165.3				120		
19	Honore Mercier Bridge	Highway	166.9			250	120		Fixed.
20	Overhead cable	Power	167.0				120		
21	Canadian Pacific Ry. bridge	Railroad	167.1			250	120		Vertical lift.
	Beauharnois Lock		182.2						
22	Overhead cables	Power	182.3				120		
23	Overhead cable	Power	182.6				120		
24	Overhead cable	Power	182.7				120		
	Melocheville Lock		183.2						
25	ConRail bridge	Railroad	183.3			80			Swing.
26	St. Louis Bridge	Highway & Railroad	189.5			175	120		Vertical lift. Clearance down 14 feet.
27	Valleyfield Bridge	Highway & Railroad	195.1			180	120		Vertical lift. Clearance down 10 feet.
28	Seaway International Bridge	Highway	231.7			600	122		Fixed.
	Bertrand H. Snell Lock		233.5						
29	Overhead cables	Power	234.6				140		
	Dwight D. Eisenhower Lock		237.1						
30	Iroquois Lock Bridge	Highway	262.3						Rolling lift.
	Iroquois Lock		262.4						
31	Ogdensburg-Prescott Bridge	Highway	272.3			1,150	129		Suspension.
32	Thousand Islands Bridge	Highway	311.9			800	152		Suspension.

Eisenhower Lock to Richards Point (Light 55), 11.5 knots;

Richards Point (Light 55) to Morrisburg (Buoy 84), 13 knots;

Morrisburg (Buoy 84) to Ogden Island (Buoy 99), 11.5 knots;

Ogden Island (Buoy 99) to Blind Bay (0.5 mile east of Buoy 162), 13 knots;

Blind Bay (0.5 mile east of Buoy 162) to Deer Island (Light 186), 11.5 knots;

Deer Island (Light 186) to Bartlett Point (Light 227), 8.5 knots upbound and 10.5 knots downbound;

Bartlett Point (Light 227) to Tibbetts Point, 13 knots;

Junction of Canadian Middle Channel and Main Channel abreast of Ironsides Island to open waters between Wolfe and Howe Islands through the said Middle Channel, 9.5 knots;

Port Robinson to Ramey's Bend through the Welland By-Pass, 8 knots;

All other canals, 6 knots;

Fluctuations of water level.–The water levels of the various reaches of the St. Lawrence River are fairly constant. Some variations from normal may occur at the power dams. A wind blowing constantly from one direction may cause a short-term fluctuation of up to about 2 feet above or below normal.

When water levels at the Kingston, Ont., or Ogdensburg, N.Y., gages fall below Low Water Datum, the traffic control stations broadcast low water warnings. These broadcasts are made every two hours until the levels return above Low Water Datum.

Currents.–The current velocities in the St. Lawrence River are varied depending on the reach or channel. From Montreal to Ogdensburg, N.Y., the maximum velocity in the navigation channels is generally about 2.3 knots, except in the area of Pollys Gut just below Snell Lock. The current sets through Pollys Gut and into the channel at a rate of 3 to 6 knots. At the Seaway International Bridge, just E, the current is 3 to 4 knots. From Ogdensburg to Lake Ontario, the fall of the river is only 1 foot and the current velocity in many channels is less than 0.6 knot.

Weather.–The deep, narrow St. Lawrence River Valley can channel, deflect, intensify, or reduce the prevailing winds. As might be expected from the orientation of the valley, winds blow frequently from SW and NE, particularly strong winds. Extremes, usually from these directions, have been clocked at 40 to 60 knots. Strong northeasterlies are often generated by lows that pass to the S or those that traverse the Great Lakes region when a high lingers in the Gulf of St. Lawrence. Downriver winds, from the SW to W, prevail in the wake of these storms. An intense storm along the Atlantic coast will usually generate N to NW winds along the upper St. Lawrence River, which is somewhat sheltered by the hills to the N. Gales are most likely from November through April. Summer windspeeds usually average less than 9 knots; speeds of 17 knots or more occur less than 10 percent of the time. Occasional strong winds are usually associated with thunderstorm gusts. Summer winds rarely blow up river. Southwesterlies and westerlies prevail.

Fog, precipitation, haze, and smoke all can reduce visibilities. Fog is the most common and usually the most restrictive. Along this portion of the St. Lawrence River, fog (visibilities less than 1,100 yards) occurs on about 25 days each year, mainly from fall through spring. It often forms on cool, calm, clear nights onshore and drifts out over the water. It usually burns off by noon. Sometimes in spring, warm air moving over the cold river will create a dense, persistent fog. However, this is more common over the wider lower St. Lawrence River. Smoke from brushfires in September and October can reduce visibilities. Visibility may also be briefly restricted below 2 miles by rain or snow.

Ice.–Before the closing of the St. Lawrence Seaway and after its spring opening, some typical river ice may be encountered. Shore-fast ice begins to form in December, and its main outlines are established by early January. The formation spreads upstream from St. Regis. Drift ice is sometimes found in the shipping channels toward the end of the navigation season and the beginning of the new one. The ice begins to melt, usually in early March, near the entrance to Lake Ontario. There is a gradual clearing of shipping lanes and the whole area is normally free of ice by the end of April.

Pilotage.–The waters of the St. Lawrence River described in this chapter are Great Lakes designated waters. All registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. Registered pilots for the reach from St. Regis to Lake Ontario are supplied by the Great Lakes Pilotage Authority, Ltd., Cornwall, and the St. Lawrence Seaway Pilots Association. (See appendix for addresses.) Pilot exchange points are at Snell Lock and off Cape Vincent, N.Y. (See Pilotage, chapter 3, and **46 CFR 401,** chapter 2.)

Chart 14761.–The **International boundary** between the United States and Canada extends from E and intersects the St. Lawrence River at **St. Regis, Que.,** opposite the lower end of Cornwall Island, about 116 miles below the head of the river at Lake Ontario.

Chart datum.–Depths below Snell Lock are referred to the sloping surface of the river when the gage at Summerstown, Ont., 6.5 miles below Cornwall Island, reads 151.4 feet and the gage at Pollys Gut, just below Snell Lock, reads 152.8 feet. These elevations are above mean water level at Pointe-au-Pere (Father Point), Que., on International Great Lakes Datum (1955).

The main vessel route in this section of the river extends from Lac Saint-Francois on the N side of Ile Saint-Regis and thence between the W end of Ile Saint-Regis and the E end of **Cornwall Island.** Here the vessel route enters United States waters for the first time and in the remainder of the river follows deep water without regard to the International boundary.

Calling-in point.–Upbound vessels shall contact "Seaway Eisenhower" on VHF-FM channel 12 (156.60 MHz) when approximately abeam of the lower end of Cornwall Island. After initial contact, vessels shall guard VHF-FM channel 12. (See the Seaway Handbook for details.)

The vessel route extends along the S side of Cornwall Island to Snell Lock at the E end of Wiley-Dondero Canal.

Currents.–Just below Snell Lock, a current of 3 to 6 knots sets out of Pollys Gut. At the Seaway International Bridge, this current is 3 to 4 knots.

Cornwall, Ont., a city on the N side of the river N of Cornwall Island, is a **Canadian customs port of**

entry. A field office of the St. Lawrence Seaway Authority is in Cornwall. (See appendix for address.) A dredged channel, marked by buoys, branches from the main vessel route at the lower end of Cornwall Island and extends W for about 3 miles to the midpoint of the city waterfront. The channel has a project depth of 29 feet.

Wharf.–Valley Terminals and Stevedore, Inc. receives petroleum products, liquid chemicals, and general cargo at a 575-foot wharf on the N side at the W end of the channel. The wharf has a reported depth of 27 feet alongside and a deck height of 6 feet. Cranes to 150 tons, 25,000 square feet covered storage, and 50,000 square feet open storage are available.

Tugs are available with sufficient notice, but are not normally required for berthing. Water, fuel oil, provisions, and engine and above-the-waterline hull repairs are available at Cornwall.

The **Cornwall Canal** was permanently closed to navigation in 1968.

Raquette River flows into the S side of the St. Lawrence River near lower end of Cornwall Island. The river has depths of 12 feet at the mouth, but shoals rapidly to 2 feet and has several small islands and a submerged crib within 0.7 mile of the mouth.

Calling-in point.–Upbound vessels shall contact "Seaway Eisenhower" on VHF-FM channel 12 (156.60 MHz) when about 0.5 mile below Seaway International Bridge. After initial contact, vessels shall guard VHF-FM channel 12. (See the Seaway Handbook for details.)

Grass River flows into the S side of the St. Lawrence River just below the E end of Wiley-Dondero Canal. The river is navigable for about 6.5 miles to the junction with Massena Canal, but is obstructed by numerous boulders near the junction. The three bridges that cross the river below the junction have a least clearance of 39 feet.

Wiley-Dondero Canal, cut in part through the U.S. mainland, extends from just W of the mouth of Grass River W for about 10 miles past the **Long Sault Islands** to the vicinity of the **Croil Islands.** The canal, with its two locks, serves to raise vessels from the level of Lac Saint-Francois to that of Lake St. Lawrence. **Bertrand H. Snell Lock,** at the E end of the canal, has a normal lift of 45 to 49 feet. **Dwight D. Eisenhower Lock,** 3.5 miles W of Snell Lock, has a normal lift of 38 to 42 feet.

A **speed limit** of 7 mph is enforced in the canal between Eisenhower and Snell Locks.

Calling-in point.–Downbound vessels shall contact "Seaway Eisenhower" on VHF-FM channel 12 (156.60 MHz) when approximately abeam of the central island of the Croil Islands. After initial contact, vessels shall guard VHF-FM channel 12. (See the Seaway Handbook for details.)

Currents.–Crosscurrents with velocities to 2 knots have been reported in the Wiley-Dondero Canal. These currents set NE along the lower end of the Long Sault Islands and ESE at the upper end of the islands.

Standby areas for small craft awaiting transit through the locks are on the S side of the canal just W of Snell Lock and just E of Eisenhower Lock. The areas are each marked by a buoy. Mooring cells for deep-draft vessels awaiting transit are on the S side of the canal 0.9 mile W of Snell Lock, 1.1 miles E of Eisenhower Lock, and 1.6 miles W of Eisenhower Lock. Each set of mooring cells is marked at each end by a light, and all but the latter have a catwalk.

Lake St. Lawrence is contained by Eisenhower Lock and by two dams. **Moses-Saunders Power Dam,** 3 miles NE of the lock, extends from the E end of **Barnhart Island** across the International boundary to the Canadian mainland. **Long Sault Spillway Dam** connects the mainland N of Eisenhower Lock to the W end of Barnhart Island. The dam has thirty 50-foot-wide vertical gates. All vessels are cautioned not to approach either dam within 1,000 feet.

Chart datum.–Depths between Eisenhower Lock and Iroquois Lock are referred to the sloping surface of the river when the gage above Eisenhower Lock reads 237.5 feet and the gage below Iroquois Lock reads 239.7 feet. These elevations are above mean water level at Pointe-au-Pere (Father Point), Que., on International Great Lakes Datum (1955).

A marina in a basin on the NW side of Barnhart Island provides gasoline, diesel fuel by truck, ice, sewage pump-out, some marine supplies, and a launching ramp. In 1977, depths of 4 to 8 feet were reported alongside. A marina on the Canadian shore 2.4 miles NW has electricity, gasoline, diesel fuel, marine supplies, sewage pump-out, water, ice, and a mobile lift and marine railways that can handle craft to 50 tons or 55 feet long for hull and engine repairs.

Massena Canal, a former power canal, extends SE from the St. Lawrence River near the upper end of the Long Sault Islands for 2.8 miles to the junction with Grass River. The canal is closed to navigation by a dam at either end. **Massena, N.Y.,** at the junction of Massena Canal and Grass River, is the site of the field headquarters of the Saint Lawrence Seaway Development Corporation. (See appendix for address.)

Massena is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Wharf.–Metropolitan Petroleum Co., Inc. receives petroleum products at a wharf on the S side of Wiley-Dondero Canal in 44°57'57"N., 74°55'05"W. The wharf has 650 feet of berthing space with dolphins and a depth of 30 feet alongside in 1977.

Chart 14762.–Coming out of Wiley-Dondero Canal on the S side of Croil Islands, the vessel route turns SW on the S side of **Cat Island** and **Cat Island Shoal,** thence N of **Wilson Hill Island,** S of **Weaver Shoal,** N of **Bradford Island, Crysler Shoal,** and **Goose Neck Island Shoals,** between **Doran Shoal** on the E and **Broder Island** on the W, and N of **Murphy Islands** and **Murphy Shoal** to the vicinity of Morrisburg, Ont.

The light marking the N side of the Crysler Shoal is equipped with a radar transponder beacon (Racon). (See Racons, chapter 1, for additional information.)

About 1.5 miles SSW of Crysler Shoal, a channel leads S to a marina. The marina provides gasoline, diesel fuel by truck, water, ice, electricity, sewage pump-out, some marine supplies, and a launching ramp. A 10-ton lift is available for hull and engine repairs. In 1977, depths of 4 to 8 feet were reported alongside the berths.

Calling-in point.–Upbound vessels shall contact "Seaway Iroquois" on VHF-FM channel 11 (156.55 MHz) and downbound vessels shall contact "Seaway Eisenhower" on VHF-FM channel 12 (156.60 MHz) when approximately abeam of Bradford Island. After initial contact, vessels shall guard VHF-FM channels 11 (upbound) and 12 (downbound). (See the Seaway Handbook for details.)

Anchorage.–A designated anchorage is on the N side of the vessel route opposite Wilson Hill Island, between Weaver Shoal and Cat Island Shoal. The NW limit of the anchorage is marked by lighted buoys. Mariners are cautioned against anchoring near a wreck, covered 47 feet, near the W end of the anchorage.

Morrisburg, Ont., is a town on the N side of the St. Lawrence River, 17 miles above Eisenhower Lock. Church spires in town and a silver water tank on the N side of the town are prominent from the river. An L-shaped Government wharf at the town has a depth of about 9 feet alongside.

Anchorage.–A designated anchorage marked by buoys is off the harborfront at Morrisburg.

From Morrisburg, the vessel route continues SW between **Canada Island** and **Clark Island Shoal,** thence follows close to the Canadian shoreline around the N side of **Ogden Island** and continues SW for about 4 miles to Iroquois Lock.

Currents.–The river currents in the reach from Morrisburg to Iroquois are reported to often reach a velocity of 2 knots. The current sets N immediately E of Canada Island. An E set into Little River may be felt at the upper end of Ogden Island.

Waddington, N.Y., is a village on the S side of **Little River,** the channel of the St Lawrence River S of Ogden Island. The village wharf had a reported depth of 27 feet alongside in 1977.

Calling-in point.–Upbound vessels shall contact "Seaway Iroquois" on VHF-FM channel 11 (156.55 MHz) when approximately abeam of the upper end of Ogden Island. After initial contact, vessels shall guard VHF-FM channel 11. (See the Seaway Handbook for details.)

Chart 14763.–Iroquois, Ont., is a village on the NW side of the river about 7 miles above Morrisburg and 13 miles below Ogdensburg. **Iroquois Dam,** just above the village, extends from **Rockway Point** on the United States shore to **Harkness Island** on the Canadian side. The 2,700-foot-long dam is a buttressed gravity structure with 32 openings, each with a vertical-lift gate. **Iroquois Lock,** with a lift of 0.5 to 6 feet, is between the W side of Harkness Island and Iroquois Island and provides a passage around the dam.

Small pleasure craft may, at their own risk, pass through the portals of Iroquois Dam when the gates are fully open. A minimum overhead clearance of 8½ feet is provided through sluice No. 28 for downbound passage and through sluice No. 30 for upbound passage. The piers of sluice No. 28 are painted with the standard red and black channel markings on the upstream side of the dam, and the piers of sluice No. 30 are marked similarly on the downstream side of the dam.

Caution.–Although the dam is usually operated in a fully open position, some or all of the gates may be closed or partially closed without prior notice. The Seaway Authority advises that small craft passing through the dam sluices are outside of the Authority's jurisdiction and that it is not responsible for any damage resulting from the use of these facilities.

Chart datum.–Depths above Iroquois Dam are referred to the sloping surface of the river when the gage above Iroquois Lock reads 239.9 feet and Lake Ontario is at Low Water Datum, elevation 242.8 feet. These elevations are above mean water level at Pointe-au-Pere (Father Point), Que., on International Great Lakes Datum (1955).

The upbound channel coming out of Iroquois Lock is marked by a **205°48′** leading light on **Sparrowhawk Point.** The vessel route leads S of **Toussaint Island,** thence N of **Galop Island, Chimney Island,** and **Chimney Point** to Ogdensburg, N.Y. **Old Galop Canal,** now closed to navigation, follows the Canadian shore from just below Iroquois Lock upstream for about 7 miles. **North Channel,** the upper entrance to Old Galop Canal, is N of Chimney Island, between **Drummond Island** and **Spencer Island.**

Currents.–River currents between Iroquois and Ogdensburg are generally about 2 knots. The current has a N set at the upper end of Galop Island and an E set just below Ogdensburg-Prescott Bridge. The current increases to 3 knots and has an E set off **Cardinal, Ont.,** 4.5 miles above the Iroquois Lock.

Two small marinas on the U.S. shore behind Galop Island provide gasoline, diesel fuel, water, ice, electricity, some marine supplies, launching ramps, and repairs to trailerable craft.

Calling-in point.–Downbound vessels shall contact "Seaway Iroquois" on VHF-FM channel 11 (156.55 MHz) when approximately abeam of the lower end of Galop Island. After initial contact, vessels shall guard VHF-FM channel 11. (See the Seaway Handbook for details.)

Ice booms.–An ice boom extends from the SW end of Galop Island across the navigational channel to the S end of **Lame Squaw Island** during the non-navigation season. The 400-foot section across the channel is marked by lights. The connected logs that form the boom are anchored to the river bottom through a series of anchors and cables that extend about 500 feet upstream. The ice boom may be opened when required for movement of vessels. Other ice booms with similar anchorages, but not across the navigation channel, are on the W side of Chimney Point and between the U.S. mainland and Galop Island.

Ogdensburg-Prescott Bridge, a suspension span with a clearance of 129 feet across the ship channel, crosses the St. Lawrence River 10 miles above the Iroquois Lock.

In December 1980, a ship's anchor was reported about 0.5 mile above the Ogdensburg-Prescott Bridge in about 44°43'48"N., 75°28'03"W.

Wharf.–Lower Lakes Terminal of the Canadian National Harbours Board is on the NW side of the river W of Chimney Point. The terminal has a 5½-million-bushel grain elevator. Grain, salt, fertilizer, and liquid calcium chloride are received at a 1,294-foot wharf on the S side of the N terminal slip. Grain is shipped from a 927-foot wharf on the N side of the S terminal slip. In 1977, the wharves had reported depths of 27 feet alongside. Pilots and tugs are available for berthing at the terminal. Four hours' notice is required for a pilot.

A marina, just N of Lower Lakes Terminal, provides gasoline, diesel fuel, electricity, water, ice, a launching ramp, and a lift and marine railway for hull and engine repairs.

Chart 14764.–Ogdensburg, N.Y., is a town and harbor on the SE side of the St. Lawrence River about 42 miles above Snell Lock and 62 miles below Lake Ontario. The harborfront is separated from the main river channel by an extensive shoal bank. The **Oswegatchie River** enters the St. Lawrence River near the upper end of the harbor.

Channels.–Entering from the St. Lawrence River, the upper entrance to the harbor is through a dredged channel leading to the mouth of the Oswegatchie River, thence upstream to just below the third highway bridge. The harbor's lower entrance is through the turning basin at the E end of the harbor and thence through the city-front channel to the mouth of the Oswegatchie River. The channel limits are marked by lighted and unlighted buoys.

In August 1983, the controlling depths were 19 feet through the upper entrance channel, thence 15 feet (19 feet at midchannel) in the city-front channel except for shoaling to 3 feet along the N edge, thence 20 feet in the turning basin with lesser depths along the S and SE edges. The controlling depth in Oswegatchie River to the head of the project was 13 feet. Above the head of the project, depths are less than 4 feet for 0.3 mile to the dam.

Caution.–Ruins of a ferry pier extend from shore on the W side of the upper entrance channel. A private lighted buoy marks the outer end of the ruins.

Bridges.–Fixed highway bridges crossing Oswegatchie River 0.6, 0.63, and 0.7 mile above the entrance have a least clearance of 15 feet.

Ogdensburg is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Wharves.–Ogdensburg has several deep-draft facilities along the dredged harborfront and close SW of the city. The alongside depths given for the facilities described are reported depths. All the facilities described have highway connections.

Ogdensburg Bridge and Port Authority Marine Terminal: (44°42'32"N., 75°29'11"W.); 600-foot face; 27 feet alongside; deck height, about 12 feet; 52,000 square feet covered storage; 8 acres open storage; 20-ton crane; water and electrical shore-power connections; pipelines extend to storage tanks; receipt and shipment of general and bulk cargo; receipt of petroleum products; owned and operated by Ogdensburg Bridge and Port Authority.

Augsbury Corporation Terminal: 0.4 mile SW of Ogdensburg Bridge and Port Authority Marine Terminal; 1,510 feet of berthing space; 14 to 15 feet alongside; deck height, about 7 feet; pipelines extend to storage tanks; water and electrical shore-power connections; receipt of petroleum products, coal, and salt; owned and operated by Augsbury Corp.

Gulf Oil Ogdensburg Terminal: (44°41'18"N., 75°30'48"W.); 400 feet of berthing space with dolphins; 20 feet alongside; deck height, about 7 feet; pipelines extend to storage tanks; receipt of petroleum products; owned and operated by Gulf Oil Co. U.S.

Texaco Ogdensburg Terminal: 0.2 mile SW of Gulf Oil Ogdensburg Terminal; 400 feet of berthing space with dolphins; 16 feet alongside; deck height, about 6 feet; pipelines extend to storage tanks; receipt of petroleum products; owned by Texaco Inc. and operated by Texaco Inc. and Exxon Co. U.S.A.

Madden Dock: 0.65 mile SW of Texaco Ogdensburg Terminal; 450-foot face; 25 feet alongside; deck height, about 7 feet; pipelines extend to storage tanks; receipt of petroleum products; owned by Augsbury Corp. and operated by Agway Corp.

Supplies.–Diesel oil, water, provisions, and some marine supplies are available at Ogdensburg.

Small-craft facilities.–The 300-foot city dock had a reported depth of 17 feet alongside in 1977. Use of the dock is limited to pleasure craft. Several marinas at Ogdensburg provide transient berths, gasoline, water, ice, electricity, some marine supplies, a sewage pump-out facility, and launching ramps.

Ice boom.–An ice boom extends from shore just above Ogdensburg across the river to Prescott, Ont., during the non-navigation season. A 400-foot section across the navigation channel is marked by lights. The connected logs that form the boom are anchored to the river bottom by a series of anchors and cables that extend about 500 feet upstream. The ice boom may be opened when required for movement of vessels.

Prescott, Ont., a town on the NW side of the river opposite Ogdensburg, is a **Canadian customs port of**

entry. A Canadian Coast Guard Base is on a wharf near the middle of the town's waterfront. Municipal wharves at the town provide berthing for pleasure craft, and a launching ramp is available.

Caution.–The testing of various aids to navigation may be heard and/or seen at the Prescott Canadian Coast Guard Base. Mariners should exercise caution in the vicinity so as not to confuse the test aids with the standard channel aids.

A wreck, covered 4 feet, is 600 feet from shore 0.7 mile SW of Prescott Canadian Coast Guard Base.

Anchorage.–A designated anchorage just above Ogdensburg and Prescott has depths of 7 to 10 fathoms, clay and shingle bottom. A cable area crosses the river between the two cities at the lower end of the anchorage.

Above Ogdensburg the river is deep and wide for about 10.5 miles to the **Three Sisters Islands,** and the vessel route follows a general midriver course. **Catamaran Shoal,** covered 12 feet, is marked on the N side by a buoy about 8 miles above Ogdensburg. At the Three Sisters Islands, the vessel route extends between **McNair Island** and **North McNair Shoal.** The shoal has a least depth of 14 feet and is marked on the S side by a buoy.

Calling-in point.–Downbound vessels shall contact "Seaway Iroquois" on VHF-FM channel 11 (156.55 MHz) when about 1.5 miles below Catamaran Shoal. After initial contact, vessels shall guard VHF-FM channel 11. (See the Seaway Handbook for details.)

Charts 14764, 14770.–Morristown, N.Y., is a village and small-craft harbor on a small inlet on the SE side of the river opposite the Three Sisters Islands.

Channels.–A dredged channel leads from the St. Lawrence River into the inlet to 250 feet below the highway bridge that crosses it. In 1964, the controlling depth was 7 feet.

Small-craft facilities.–A public dock and launching ramp are on the E side of the inlet. In 1977, a depth of 10 feet was reported alongside the dock. Two marinas at Morristown provide transient berths, gasoline, diesel fuel by truck, water, ice, electricity, sewage pump-out, some marine supplies, and a launching ramp. A 5-ton mobile lift is available for hull and gasoline engine repairs.

Brockville, Ont., is a city and harbor on the NW side of the river about 11 miles above Prescott and just W of the Three Sisters Islands. Brockville is a **Canadian customs port of entry.**

Blockhouse Island, attached to the shore at Brockville, protects a small-craft basin. A 467-foot Government wharf with a depth of 12 feet alongside extends W from the island. A marina in the basin provides gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies and a launching ramp. A 25-ton hoist is available for hull and engine repairs.

The stretch of river from Brockville upstream to Lake Ontario is thickly strewn with large and small islands known as the **Thousand Islands.** No attempt is made here to mention each island and shoal in the group. The nautical charts are the best guide and are a necessity for navigating any portion of this stretch.

Charts 14764, 14765, 14770.–Brockville Narrows is a partially dredged reach about 3 miles long that extends upstream from just above Brockville. The channel leads close to the Canadian shore through a group of islands that fill the river from bank to bank. The channel that parallels Brockville Narrows close to the New York shore is not suitable for deep-draft vessels. Numerous shoal spots of less than 2 feet are between the New York shore and the main channel.

Charts 14765, 14770, 14771.–Coming out of Brockville Narrows, the vessel route extends SW between **Cole Ferry Shoal** and **Cole Shoal.** This reach is marked at the lower end by a **036°55′** lighted range. At **Whaleback Shoal,** about 3 miles above Brockville Narrows, the vessel route turns SSW for 2.5 miles on the E side of **Bay State Shoal** and **Crossover Island.** This reach is marked by a **013½°** lighted range and by Chippewa Point Directional Light at the lower and upper end, respectively.

Anchorage.–A designated anchorage marked by buoys is on the W side of the vessel route abreast the turn at Whaleback Shoal.

Calling-in point.–Upbound vessels shall contact "Seaway Clayton" on VHF-FM channel 13 (156.65 MHz) and downbound vessels shall contact "Seaway Iroquois" on VHF-FM channel 11 (156.55 MHz) when approximately abeam of Crossover Island. After initial contact, vessels shall guard VHF-FM channels 13 (upbound) and 11 (downbound). (See the Seaway Handbook for details.)

A natural deepwater channel marked by lights and buoys leads SW from the turn at Whaleback Shoal and roughly follows the Canadian shore N of **Grenadier Island.**

Oak Point, N.Y., is a small summer resort on the SE side of the river 2.4 miles above the upper end of Brockville Narrows. Boats drawing not more than 6 feet can land here, but caution is advised to avoid the shoals and small islands in the landing approach.

Blind Bay is a small inlet just E of Chippewa Point Directional Light. A sign marks the E side of the entrance. Several overhead cables with a reported least clearance of 28 feet cross the entrance channel. In 1977, a reported depth of 4 feet could be carried along the N shore to a marina in the NE corner. Some marine supplies and gasoline engine repairs are available.

Charts 14765, 14771.–From Blind Bay, the vessel route follows a series of short reaches across the mouth of Chippewa Bay and passes NW of **Superior Shoal,** SE of **Jorstadt Island,** NW of **Haskell Shoal,** thence SE of Grenadier Island on the SE sides of **Empire Shoal** and **Sister Island Shoal,** NW of **Third Brother Island,** and SE of **Lone Brother Island.**

Chippewa Bay, on the SE side of the river, is enclosed by **Chippewa Point, Cedar Island,** and **Oak Island.** The bay is filled with numerous small islands, rocks, and shoals; local knowledge is advised. **Chip-**

pewa Bay, N.Y., a village on the E side of the bay, can be reached by boats drawing 4 feet. **Schermerhorns Landing,** 2.5 miles SW, has a marina with gasoline, water, ice, electricity, some marine supplies, and a launching ramp. A 5-ton forklift can haul 21-foot boats for hull and gasoline engine repairs.

Charts 14765, 14772.–From Lone Brother Island, the vessel route continues SW, between **Ironsides Shoal** on the NW and **Ironsides Island** and **Inner Ironsides Shoal** on the SE, thence SE of **Whiskey Island Shoal** off the mouth of Goose Bay.

Goose Bay is on the SE side of the St. Lawrence River, SE of Whiskey Island Shoal and the upper end of Grenadier Island. The bay is very shallow and has a mud bottom with numerous rocks.

Charts 14766, 14767, 14772, 14773, 14774, *1419, *1420, *1421.–Canadian Middle Channel branches W from the main vessel course at Ironsides Island and leads through the Thousand Islands on the Canadian side of the International boundary, thence between Wolfe Island and Howe Island and into Lake Ontario in the vicinity of Kingston, Ont. The channel, marked by numerous lights and buoys, has a controlling depth of 14 feet.

Speed limit.–A speed limit of 9.5 knots has been established for all vessels when transiting Canadian Middle Channel or the adjacent waters, unless otherwise indicated through Seaway Notices.

Above Ironsides Island, Canadian Middle Channel leads past the SW end of Grenadier Island, thence through **Raft Narrows** along the mainland. The main channel through the narrows is crossed by a fixed highway bridge with a clearance of 133 feet. Above the narrows, the channel divides around Wood Island, along the N side upbound and the S side downbound. Thence the channel leads between **Wallace Island** and **Ash Island,** SW past **The Navy Islands,** and through the S part of **The Lake Fleet Islands** to a point N of **The Punts,** thence S of **Leek Island** and into the deep wide water between Wolfe and Howe Islands.

Charts 14766, 14772.–Rockport, Ont., a small village on the N side of the river at the E end of Raft Narrows, is a **Canadian customs vessel reporting station.** An L-shaped customs wharf at the village had reported depths of 23 feet along the outer face in 1977. A Government wharf used by pleasure craft had 20 feet reported alongside in 1977. Marinas at the village provide gasoline, water, sewage pump-out, and normal small-craft services. A 50-ton marine railway is close NE of the village.

Ivy Lea, Ont., is a small resort village about 1.4 miles W of the bridge across Raft Narrows. An L-shaped Government wharf at the village has a 116-foot outer face with about 2 feet at the W end and 8 feet at the E end. Several marinas at the village provide gasoline, sewage pump-out facilities, launching ramps, and other small-craft services.

Charts 14767, 14774.–Gananoque, Ont., is a town at the mouth of **Gananoque River,** about 12 miles W of Rockport and 18 miles E of Kingston. Gananoque Harbour Light is about 0.3 mile SW of the river mouth. A chimney close SW of the river mouth is prominent. A swing bridge with a clearance of about 14 feet crosses the river mouth. A 580-foot Government wharf with depths of 8 to 12 feet alongside extends SW along shore from the river mouth. A **Canadian customs vessel reporting station** is on the wharf. A 240-foot Government wharf 0.3 mile W of the river mouth has depths of 6 feet along all but the inner 50 feet. Marinas at Gananoque provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. A 25-ton hoist is available for hull and engine repairs.

Charts 14768, 14802, *1459.–Kingston Harbour, serving the city of **Kingston, Ont.,** is on the N side of the head of the St. Lawrence River at the mouth of **Cataraqui River.**

Prominent features.–The most prominent object at Kingston is the 232-foot white chimney just SSW of the General Hospital. Other prominent objects are the tower of St. Marys Cathedral, the 159-foot dome of St. Georges Cathedral, several other church spires, and a large white stack close to shore W of the river mouth.

Channels.–Kingston Harbour is divided into lower and inner sections by a causeway that crosses the river 0.7 mile above the mouth. The main entrance to the lower harbor leads W of Carruthers Shoal in the river mouth. The channel is marked by lighted and unlighted buoys and a directional light. In 1977, the reported controlling depth was 16 feet. From the lower harbor a channel with a reported controlling depth of 16 feet in 1977 leads N through the causeway to the inner harbor. In 1977, the reported controlling depth in the dredged inner harbor basin was 19 feet. **Anglin Bay,** on the W side of the inner harbor had depths of 7 to 13 feet in 1976.

A channel between Point Frederick Shoal and Caruthers Shoal, locally known as East Channel, had a depth of 10 feet in 1978.

Dangers.–Penitentiary Shoal, with a least depth of 11 feet, is marked on the N side by a lighted buoy 2 miles WSW of the river mouth. In June 1981, a 34-foot spot was reported about 0.5 mile W of Penitentiary Shoal in about 44°12'33"N., 76°31'20"W. **Myles Shoal,** with a least depth of 9 feet, is marked on the N side by a lighted buoy 1 mile SSW of the river mouth. **Carruthers Shoal,** an extensive bank with depths of 7 feet, is near the middle of the river mouth, parallel to the W shore. A lighted buoy marks the SW end of the shoal.

Bridge.–LaSalle Causeway crosses Cataraqui River about 0.7 mile above the mouth. The bascule span across the main navigation channel has a clearance of 6 feet.

The schedule for the bascule bridge is as follows:

a. Daily, from about April 8 to December 15, the bridge is raised for traffic every half hour between the hours of 0600 and 2200, except at 0800, 1230, 1630, and 1700.

b. For commercial and Government vessels requiring raising of the bridge between the hours of 2200 and 0600, the bridge will be raised, but only by advance arrangement with the local office of Federal Department of Public Works.

The opening signal for the bridge is three long and one short blasts. The fixed spans at the E and W ends of the causeway have clearances of 20 feet and 6 feet, respectively.

Caution.–Strong W or SW winds can raise the water level in Kingston Harbour, and strong E or NE winds can lower the level.

Local magnetic disturbance.–Differences of as much as about 27°W. to 3°E. from normal variation have been observed near Kingston Harbour. Extreme caution should be exercised in thick weather by mariners approaching or leaving Kingston Harbour by magnetic compass.

Towage.–Tugs are available from McAllister Towing and Salvage Co. and Canadian Dredge and Dock Co. for assisting vessels in the harbor.

Kingston is a **Canadian customs port of entry.**

Harbor regulations.–A **speed limit** of 7 knots is enforced in Kingston Harbour. The **harbormaster** office is at the head of the Government wharf on the W side of the lower harbor.

Wharves in lower harbor.–The 350-foot Public (Crawford) Wharf (44°13'47.8"N., 76°28'39.8"W.), marked on its outer end by a light, is on the NW side of the lower harbor; depths of 7 feet alongside the S face, 11 feet alongside the N face. The Customs wharf, second wharf to the N, has five finger piers with depths of 15 feet alongside. The Kingston-Wolfe Island ferry terminal wharf is next N. The ferry berths on the N side.

Wharves in inner harbor.–A 620-foot Public Wharf is on the N side of LaSalle Causeway immediately E of the main opening; depths of 8 to 11 feet alongside. The 318-foot Department of Public Works wharf is immediately W of the opening with depths alongside of 13 feet. Anglin Coal Wharf, on the S side of Anglin Bay, has a depth of 14 feet alongside. An oiling dock on the N side of the bay has 7 to 13 feet alongside; it forms the N entrance point to Anglin Bay

A 454-foot Department of National Defence wharf is N of the E end of LaSalle Causeway with depths of 7 to 8 feet alongside.

Supplies.–Deck supplies, provisions, water, bunker oil, and diesel fuels are available.

Repairs.–Canadian Dredge and Dock Co., on the W side of Anglin Bay, has a graving dock 210 feet long, 48 feet wide, and with 11 feet over the sill. All types of repairs are made. Several machine and welding shops in the area also make repairs.

Small-craft facilities.–In the lower harbor, a marina immediately S of Public (Crawford) Wharf provides transient berths with electrical power; depths of 5 to 6 feet alongside. A private yacht club is at the SW entrance point of the lower harbor. The club has a 9-ton marine railway.

Ferry.–A passenger and automobile ferry operates from the W side of the lower harbor to Wolfe Island. The ferry docks on Wolfe Island at the village of Wolfe Island (Marysville) during the high-water season from about May to August and at Dawson Point (44°12.9'N., 76°25.6'W.) during the winter and low-water season.

Charts *1512, *1513.–The **Rideau Waterway** connects the Ottawa River at **Ottawa, Ont.,** with the head of the St. Lawrence River at Kingston. From Ottawa, the 123.5-mile-long waterway follows the **Rideau River** upstream to its source in the **Rideau Lakes.** Upper Rideau Lake, 80 miles above Ottawa, is the summit of the waterway. The 273-foot ascent to this lake is accomplished by 31 locks with lifts of 2 to 26 feet. At Newboro Lake, about 85 miles above Ottawa, the waterway begins its descent through several lakes before emptying into Lake Ontario through the Cataraqui River at Kingston. This 164-foot descent is accomplished by 14 locks with lifts of about 8 to 19 feet. The official draft on the waterway is 5 feet, but the waterway may normally be navigated in all sections by vessels drawing 5½ feet, except during the dry seasons. Vessels using the waterway are limited to 100 feet in length and 28 feet in beam. Somewhat larger vessels can be accommodated depending on hull configuration. Application should be made to the Canal Superintendent. Because of the rounded bottoms of some of the locks, barges, scows, and other craft with square flat bottoms are limited to a draft of 4 feet, unless they are somewhat narrower than 28 feet. The minimum vertical clearance under fixed bridges across the canal is 22 feet.

Tay Canal branches from the waterway about 65 miles above Ottawa and connects with the Tay River to Perth, Ont., a distance of 6 miles. Two locks in the canal raise vessels a total of 25 feet. The minimum vertical clearance in Tay Canal is 6 feet.

Canal regulations.–Rideau Waterway is under the jurisdiction of the Department of Indian Affairs and Northern Development. Vessels navigating the waterway are subject to the regulations contained in the publication Canal Regulations and shall carry a copy on board.

Regulations and other canal-related information may be obtained from Rideau Canal Office, 12 Maple Avenue N., Smith's Falls, Ont. K7A 1Z5. A **speed limit** of 5 mph is enforced in all waterway channels less than 150 feet wide. In addition, speed limits established for certain sections of the waterway are posted on signs along the shore or on white buoys along the channel edge. Permits are required for passage through the Rideau Waterway locks. Information on the tolls with respect to vessel permits is contained in Navigation Canals, available from Parks Canada. (See appendix for address.)

For a complete description of the Rideau Waterway, refer to Small Craft Guide, Rideau Waterway and Ottawa River, published by the Canadian Hydrographic Service and sold by the Hydrographic

Chart Distribution Office. (See appendix for addresses.)

Charts 14766, 14772.–From Whiskey Island Shoal, the main vessel route leads SW between the **Summerland Group** on the NW and the **Excelsior Group** on the SE. **Deer Island,** close SW of the Summerland Group, is marked on the SE side by a light.

Above Deer Island, the vessel route passes the lower end of Wellesley Island and leads SE of the **Manhattan Group, Frontenac Shoal,** and **Pullman Shoal** and NW of **Sunken Rock Island, Sunken Rock Shoal,** and **Cherry Island.**

Westminster Park, N.Y., is a summer resort at the lower end of Wellesley Island. The wharves at the village are in ruins and submerged.

Alexandria Bay, N.Y., is a summer resort village on the SE side of the river opposite the lower end of Wellesley Island. Wharves at the village are easily approached from the river. **Broadway Shoal,** in the approach to the village, has a depth of 13 feet and is marked by a buoy.

Alexandria Bay is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Alexandria Bay Coast Guard Station is on the SE side of Wellesley Island about 1,000 feet W of Cherry Island.

Small-craft facilities.–Small bays at either end of the village have anchorage for boats drawing 6 to 11 feet. The 460-foot village dock, about 0.25 mile NE of Cherry Island, had a reported depth of 7 feet alongside in 1977. Marinas at Alexandria Bay provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Mobile lifts to 60 tons and a 15-ton marine railway that can handle 80-foot craft are available for hull, engine, and electronic repairs. Machine shops can repair shafts up to 3 inch diameter.

Charts 14766, 14772, 14773.–**American Narrows (Upper Narrows)** separates **Wellesley Island** from the U.S. mainland for about 6 miles from Cherry Island SW to the upper end of Wellesley Island. The channel through the narrows is generally deep, has a least width of 450 feet, and is well marked by lights and buoys. The channel is bordered throughout its length by small islands and shoals.

The lower entrance to the narrows is marked by a 218° leading light at the village of Point Vivian, about 1 mile SW of Cherry Island.

In 1977, it was reported that the river current often reaches 2 knots in the entrance to the narrows from about 0.3 to 0.8 mile above Cherry Island and thence 1.5 to 2 knots SW to Swan Bay.

Swan Bay and **Brown Bay** are shallow inlets about 2.5 miles above Cherry Island on the SE and NW sides of the narrows, respectively. During the summer, gasoline is available at a small marina on the NE side of Swan Bay. In 1977, the reported depths were 3 feet in the approach and 6 feet alongside.

Thousand Islands Bridge, a suspension span with a clearance of 152 feet, crosses the narrows just W of Swan Bay.

Niagara Shoal, covered 3 feet and marked on the N side by a lighted buoy, is on the SE side of the narrows 1.5 miles above the bridge. Coming out of the narrows at the upper end of Wellesley Island, the vessel route passes SE of **Granite State Shoals,** marked by a light, and NW of **Rock Island Reef,** marked by a lighted buoy.

Fineview, N.Y., is a small settlement on Wellesley Island just below Granite State Shoals. A dock at the settlement is suitable for skiffs only because of many rocks off the end. In 1977, the reported depths were less than 2 feet alongside.

Thousand Island Park, N.Y., is a private summer resort at the upper end of Wellesley Island. In 1977, the resort dock had a reported depth of 10 feet alongside, but the dock approach from the river channel is narrow and obstructed by numerous rocks.

Fishers Landing, N.Y., is a settlement 0.8 mile SE of Fineview on the W side of **Mullet Creek Bay.** Several marinas provide transient berths, gasoline, water, ice, electricity, some marine supplies, and launching ramps. Forklifts to 4 tons can haul out 22-foot craft for hull and gasoline engine repairs. In 1977, depths of 10 to 15 feet were reported available at the berths.

Charts 14766, 14773, 14774.–Above American Narrows, the vessel course is through a wide area of generally deep water. The route passes NW of **Little Round Island** and **North Colborne Island,** marked by a light, thence SE of **Chapman Shoal,** marked by a light, and thence between **Washington Island** to SE and **Calumet Island** to NW.

A marina on the E side of **Spicer Bay,** about 1.2 miles E of Little Round Island, provides gasoline, water, ice, electricity, some marine supplies, and a launching ramp. A 12-ton fixed lift can handle 36-foot craft for hull and engine repairs. In 1977, the reported controlling depths were 4 feet in the approach and 5 feet alongside the berths.

Clayton, N.Y., is on the SE side of the St. Lawrence River about 20 miles below Lake Ontario. **Grindstone Island** is in midriver NW of Clayton, and Washington Island is close to shore NE of the village.

A causeway connects Washington Island to Clayton. The fixed span near the island end of the causeway has two 33-foot openings, each with a clearance of 6 feet.

Clayton is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Small-craft facilities.–The deep water of the river extends to within a short distance of the wharves at Clayton, at which there are depths up to 24 feet. The city dock had reported depths of 4 to 20 feet alongside in 1977. The dock has a 2 hour mooring limit. The municipal dock, marked at the outer end by a private light, is at the foot of Mary Street. In 1977, depths of 4 to 20 feet were reported alongside. Submerged ruins are on the S side at the inner end of the dock. Water and electricity are available.

Several marinas at Clayton and on Calumet Island provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Lifts to 30 tons and a 50-ton marine railway that can handle 65-foot craft are available for hull, engine, and electronic repairs. Mast-stepping service is available at Calumet Island.

Charts 14766, 14767, 14774.–Above Clayton and Calumet Island, the vessel course passes SE of **Calumet Shoal,** marked by a light, and thence N of **Bartlett Point.** A light is close off the point. A 16-foot spot is marked by a buoy about 0.5 mile WNW of Bartlett Point.

Charts 14802, 14767, 14774.–About 3 miles above Bartlett Point, the International boundary passes between the W end of Grindstone Island and the E end of Wolfe Island and thence follows close to the S shore of Wolfe Island into Lake Ontario.

Between the upper end of Grindstone Island and **Hickory Island,** an unmarked channel of natural deep water leads from the main vessel route N to connect with Canadian Middle Channel. The channel is bordered closely by islands, rocks, and shoals.

Wolfe Island Cut, leads close to the E end of Wolfe Island, between it and Hickory Island, to connect the main vessel route and Canadian Middle Channel. The channel, marked by buoys, had a midchannel controlling depth of 18 feet in 1979. Buoys mark several cribs close W of the channel. **Wolfe Island Light** (44°14.3'N., 76°11.1'W.), 37 feet above the water, is shown from a white tower on **Quebec Head,** the E point of Wolfe Island.

Charts 14802, 14767, 14768.–**Wolfe Island** is a large irregularly shaped island that extends from the broad entrance of the St. Lawrence River at Lake Ontario downriver for about 18 miles. The island is about 6 miles wide at the head of the river; downstream it diminishes in width and is indented by numerous bays.

Charts 14802, 14767.–From Bartlett Point, the vessel course continues SW for about 6 miles, passing SE of the lower end of Wolfe Island and NW of the light that marks **Linda Island.** A shoal with a least depth of 11 feet is marked at the N end by a lighted buoy 0.9 mile W of Linda Island. Near this shoal the course turns W, parallel to the Wolfe Island shore, and is marked at the W end by a directional light on **Bayfield Island** with a 261°30'–264°30' white sector.

A marina on the E side of **Millen Bay,** 2.8 miles SW of Linda Island, provides transient berths, gasoline, water, electricity, some marine supplies, a launching ramp, and minor repairs. In 1977, the reported controlling depths were 5 feet in the approach and 2 to 10 feet at the berths.

Charts 14802, 14767, 14768.–The vessel course turns S between **Carleton Island** on the E and **Carpenter Point** on the W and is marked at the lower end by a 013°20' lighted range on **Irvine Point. Hinckley Flats Shoal,** on the W side of this reach, is marked on the E side by two lighted buoys. **Feather Bed Shoal,** on the E side of the channel, is marked by a lighted buoy.

Cape Vincent, N.Y., is a village and small-craft harbor on the S side of the St. Lawrence River about 3 miles below Lake Ontario.

Channels.–A dredged channel leads along the city front on the St. Lawrence River. The channel is protected by a 1,380-foot-long breakwater which parallels the shore. The ends of the breakwater are marked by lights. The Federal project depth is 16 feet in the W part of the channel and 20 feet in the E part.

Cape Vincent is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Harbor regulations.–(See **33 CFR 207.610,** chapter 2, for harbor regulations.)

Small-craft facilities.–Deep water can be carried to the docks in the harbor, and vessels up to 10-foot draft can be accommodated. Marinas in the harbor provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, some marine supplies, and a launching ramp. Mobile lifts to 16 tons are available for hull, engine, and electronic repairs.

Ferry.–Automobile and passenger ferries operate seasonally from Cape Vincent to Point Alexandria on Wolfe Island.

Charts 14802, 14768.–**Point Alexandria** (44°08.2'N., 76°21.3'W.) is at the outer end of **Hornes Point,** a jutting peninsula at the SE end of Wolfe Island opposite Cape Vincent. A light is on the ferry pier at Point Alexandria.

Calling-in points.–Upbound and downbound vessels shall contact "Seaway Clayton" on VHF-FM channel 13 (156.65 MHz) when approximately abeam of Point Alexandria. After initial contact, vessels shall guard VHF-FM channels 16 (156.80 MHz) (upbound) and 13 (downbound). (See the Seaway Handbook for details.)

A light marks the Wolfe Island shore about 1.8 miles WSW of Point Alexandria. A lighted buoy 0.6 mile SE of the light marks the outer edge of an 18-foot shoal. **Bear Point** (44°05.7'N., 76°26.6'W.), at the head of the St. Lawrence River, is the southernmost point of Wolfe Island. A buoy 0.6 mile SSW of the point marks the outer edge of a shoal with depths of 8 feet. **Big Sandy Bay** and **Reeds Bay**, on the SW side of Wolfe Island, are separated by **Long Point**. A shoal extends 1.3 miles WSW from Long Point and is marked near the outer end by a buoy. **Horseshoe Island** is off **Staley Point** at the NW end of Wolfe Island.

Above Cape Vincent, the vessel course extends SW for about 4 miles to the waters of Lake Ontario. **Tibbetts Point Light** (44°06.0'N., 76°22.2'W.), 69 feet above the water, is shown from a white conical tower on the New York shore at the head of the St. Lawrence River. A radiobeacon is at the light. **Tibbetts Point Traffic Lighted Buoy** is about 1.8 miles W of the light.

5. LAKE ONTARIO

Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake Ontario is an elevation 242.8 feet above mean water level at Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955). (See Chart Datum, chapter 1.)

Dimensions, etc.

Length, steamer track, Burlington Bay Light to head of St. Lawrence River (Tibbetts Point); 180 miles.

Length, steamer track, Port Dalhousie to head of St. Lawrence River (Tibbetts Point); 160 miles.

Length (right line), W end of Burlington Bay to Sackets Harbor; 193 miles.

Breadth (right line), about longitude 77°35'W.; 53 miles.

Depth, maximum recorded by NOS; 802 feet.

Water surface of lake (including Niagara River and St. Lawrence River above Iroquois Dam); 3,560 square miles (U.S.), 3,990 square miles (Canada).

Entire drainage basin (including Niagara River and St. Lawrence River above Iroquois Dam); 18,760 square miles (U.S.), 16,090 square miles (Canada).

General description.–**Lake Ontario** is the smallest and easternmost of the Great Lakes. The lake is comparatively deep; the greatest depth is 802 feet, and the average depth is 283 feet, much in excess of the greatest depth of Lake Erie. Lake Ontario is fed chiefly by the waters of Lake Erie by way of the Niagara River. The lake drains at its NE end into the St. Lawrence River. Welland Canal bypasses the falls and rapids of the Niagara River and provides a navigable connection between Lake Ontario and the upper lakes.

The great depth of the lake limits fluctuations of water level caused by winds and renders them comparatively small. The lake is generally free of outlying shoals and obstructions. The only significant shoals dangerous to navigation are those in the NE end of the lake in the approach to the St. Lawrence River and those of Niagara Bar off the mouth of the Niagara River. The latter shoal is in the course of vessels plying between the Welland Canal and ports at the E end of the lake.

The waters of Lake Ontario and the Welland Canal are part of the St. Lawrence Seaway and are under the navigational control of the Saint Lawrence Seaway Development Corporation, a corporate agency of the United States, and the Saint Lawrence Seaway Authority of Canada. These agencies issue joint regulations covering vessels and persons using the Seaway. The regulations are codified in 33 CFR 401, and are also contained in the Seaway Handbook, published jointly by the agencies. A copy of the regulations is required to be kept on board every vessel transiting the Seaway. A schedule of the Seaway tolls is contained in the handbook. (See St. Lawrence Seaway, chapter 3, and **33 CFR 401,** chapter 2.)

Vessels bound for Lake Ontario from the St. Lawrence River below Montreal are limited by the size of the locks in the river, and vessels bound from Lake Ontario to the upper lakes are limited by the size of the locks in the Welland Canal. The maximum authorized dimensions for vessels navigating the St. Lawrence Seaway locks are 730 feet overall length, 76 feet extreme breadth, and 26 feet draft. (For complete information on vessel dimension restrictions, refer to the Seaway Handbook, and for supplemental information, to the Seaway Notices.)

Vessel traffic control.–Lake Ontario and the Welland Canal are divided into three traffic control sectors, with vessel movements in each sector controlled by a traffic controller. The objective of the system is to provide safe and efficient scheduling of vessel traffic, efficient search and rescue coverage, information regarding pilot requirements to the pilot dispatch centers, marine weather broadcasts, and information on vessel location to all interested parties.

The traffic control sectors are as follows: Sector 4, from Crossover Island in the St. Lawrence River to midlake in Lake Ontario; Sector 5, the W half of Lake Ontario; Sector 6, Welland Canal and its approaches.

Massena traffic control center controls traffic in the Lake Ontario portion of Sector 4 through "Seaway Sodus," VHF-FM channel 13 (156.65 MHz). St. Catharines traffic control center controls traffic in Sector 5 through "Seaway Newcastle," VHF-FM channel 11 (156.55 MHz), and in Sector 6 through "Seaway Welland," VHF-FM channel 14 (156.70 MHz).

Calling-in points.–Calling-in points on Lake Ontario follow:

Calling-in point Sodus Point.–Upbound and downbound vessels shall contact "Seaway Sodus" on VHF-FM channel 13 (156.65 MHz) when approximately abeam of Point Petre, Ont. After initial contact, vessels shall guard VHF-FM channel 16 (156.80 MHz).

Calling-in point Mid-Lake Ontario.–Upbound vessels shall contact "Seaway Newcastle" on VHF-FM channel 11 (156.55 MHz) and downbound vessels shall contact "Seaway Sodus" on VHF-FM channel 13 (156.65 MHz) upon arrival at a point in mid-lake in about 43°41'N., 77°47'W. After initial contact, vessels shall guard VHF-FM channel 16 (156.80 MHz).

Calling-in points Newcastle.–Upbound and downbound vessels shall contact "Seaway Newcastle" upon arrival at a point about 16 miles S of Newcastle, Ont., and when about 8 miles N of Thirtymile Point, N.Y. on VHF-FM channel 11 (156.55 MHz). After initial contact, vessels shall guard VHF-FM channel 16 (156.80 MHz).

Complete information on the traffic control sectors and their respective calling-in points is contained in the Seaway Handbook.

Fluctuations of water level.–The normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and fall, the lowest stages prevailing during the winter and the highest during the summer. In addition to the normal seasonal fluctuations, oscillations of irregular amount and duration are also produced by storms. Winds and barometric pressure changes that accompany squalls can produce fluctuations that last from a few minutes to a few hours. At other times, strong winds of sustained speed and direction can produce fluctuations that last a few hours or a day. These winds drive forward a greater volume of surface water than can be carried off by the lower return currents, thus raising the water level on the lee shore and lowering it on the windward shore. This effect is more pronounced in bays and at the extremities of the lake, where the impelled water is concentrated in a small space by converging shores, especially if coupled with a gradually sloping inshore bottom which even further reduces the flow of the lower return currents.

Lake Ontario has less of a seiche problem than some of the other lakes. These irregular oscillations of the water surface are less pronounced in range because of the lake's smaller area and deep water along with a general symmetrical shape. There is also a lesser number of high- and low-pressure centers that pass directly over the lake.

Weather.–Navigation-season winds are strongest in autumn. Gales are most likely from October through December and blow out of the SW through NW. This is particularly true at the E end of the lake, where a funneling effect may occur with W and SW winds, which prevail throughout most of the year. As these winds encounter land, on either side of the lake, near the Thousand Islands, they are accelerated. A moderate blow in midlake often becomes a dangerous gale in this restricted area. Another local problem area is Mexico Bay, N of Oswego. This was once known as "the graveyard of Lake Ontario" because ships foundered there in NW through NE winds. In spring, northeasterlies and easterlies occasionally reach gale force throughout the lake. May through August is often the most troublefree time; windspeeds of 16 knots or less are encountered 80 percent or more of the time. The strongest sustained measured wind on the lake was west-north-westerly at 50 knots. This short period record (17 years) occurred in November. Since extremes along the shore range from 50 to 65 knots, it could be expected that an extreme on the lake could reach 90 knots. The prevailing SW and W winds are most persistent in winter and summer. Winds with northerly components are also common in winter as are those with southerly components in summer. Autumn and spring winds are more variable.

While visibilities are restricted by rain, snow, haze, and smoke, fog is the most frequent and troublesome cause. On Lake Ontario, prolonged periods of rain and foggy weather are common when frontal systems moving into New York become stationary. In the spring, advection fog reduces visibilities to below 0.5 mile up to 10 percent of the time. It is usually worst during the morning hours. Along the shore, radiation fog is common in autumn under calm, clear nighttime skies. This fog sometimes drifts out over the water; it usually burns off by noon. Visibilities of 2.5 miles or less occur on about 10 to 13 days per month from October through March along the shore.

While rough seas can be encountered in any season, they are most often a problem during fall and winter. From October through February, wave heights of 5 feet or more can be expected 10 to near 20 percent of the time and 10 feet or more up to 2 percent of the time. Extreme wave heights of 17 to 19 feet have been encountered. Since strong winds over a long fetch of water are conducive to creating rough seas, strong winds out of the E and W quadrants over Lake Ontario are often danger signals. Sea conditions are best from May through July when waves of less than 1 foot occur 50 percent or more of the time.

Thunderstorms can occur at any time, but are mostly a summertime problem. Along the shore, they are recorded on 20 to 30 days annually; about 75 percent or more brew up from May through September. They are most likely during the late afternoon. Over the open lake, thunderstorms are most likely during August when they occur about 2 percent of the time. Summertime thunderstorms are mostly nocturnal creatures over the lake; they are most frequent between sunset and sunrise.

Ice.–The main part of Lake Ontario usually remains open throughout the winter, with only a few patches of thin ice and slush during cold spells. Its small area and great depth give Lake Ontario a large heat storage capacity. In addition, the land portion of the basin contributes more runoff to its lake than any of the other lakes. These factors retard the growth of ice in fall and aid its rapid decay in spring. During a normal winter, early ice cover appears toward the end of January and early decay begins in mid-March. During severe winters, extensive slush develops for brief periods, but the significant ice is confined to the E end of the lake. E of Prince Edward Point, ice formation begins in early January. The area from Kingston to Prince Edward Point and Oswego is usually covered 70 to 90 percent with thin and medium lake ice by the end of the month. This thckness increases during February and reaches the thick category by early March, but the extent is unchanged except for drifting patches of slush along the Canadian shore. By this time, fast ice about 20 to 25 inches thick usually extends in a N arc from Prince Edward Point to Stony Point. Decay generally develops in early March, and by the third week most of the pack has melted in place rather than drifting down the river. (See Winter Navigation, chapter 3.)

Local magnetic disturbances.–Differences from normal variation of from about 006°W to 007°E have been observed at numerous locations throughout Lake Ontario. Differences of up to 37° have been observed in the approach to Kingston, Ont., on the N side of the head of the St. Lawrence River. The locations of these anomalies are shown on NOS chart 14500.

Routes.–The Lake Carriers' Association and the Dominion Marine Association have prescribed, for vessels enrolled in the associations, the following separation of routes for upbound and downbound traffic in Lake Ontario.

Downbound vessels from Port Weller to Cape Vincent from a position 0.5 mile off Port Weller breakwaters, shall lay a course 048½° for 8.5 miles to pass not more than 1.5 miles off Niagara Bar Lighted Buoy 2; thence 074° for 103 miles to a position not less than 7 miles off Point Petre; thence 069° for 27 miles to a position 3.5 miles off Main Duck Island Light; thence 039° for 12.2 miles to East Charity Shoal Traffic Lighted Buoy.

Downbound vessels from Toronto, Port Credit, Clarkson to Cape Vincent, from a position not less than 3.8 miles off Toronto Main Harbour Channel range front light shall lay a course 085° 112 miles to a position not less than 6.9 miles off Point Petre; thence recommended downbound courses to East Charity Shoal Traffic Lighted Buoy.

Downbound vessels from Port Weller to Toronto, from a position 0.5 mile off Port Weller breakwaters, shall lay a course 315° for 4 miles; thence 349° for 20 miles to a position not less than 3.8 miles off Toronto Main Harbour Channel range front light.

Downbound vessels from Port Weller to Hamilton, from a position 0.5 mile off Port Weller breakwaters, shall lay a course 314° for 4 miles; thence 273° for 25 miles to Burlington Canal Entrance Lighted Bell Buoy MH.

Upbound vessels from Cape Vincent to Port Weller, from East Charity Shoal Traffic Lighted Buoy, shall lay a course 240° for 14.5 miles to a position 0.5 mile off Psyche Shoal Lighted Bell Buoy 12; thence 249° for 22.5 miles to a position not more than 3 miles off Point Petre; thence 254° for 102 miles to a position not less than 5.5 miles off Niagara Bar Lighted Buoy 2; thence 211½° for 11.25 miles to a position 0.5 mile off Port Weller breakwaters.

Upbound vessels from Cape Vincent to Toronto, Port Credit, and Clarkson, from a position not more than 3 miles off Point Petre, shall lay a course 263° for 111.5 miles to a position more than 2.8 miles off Toronto Main Harbour Channel range front light; thence to destination.

Upbound vessels from Toronto to Port Weller, from a position not less than 3.8 miles off Toronto Main Harbour Channel range front light, shall lay a course 163½° for 23.5 miles to a position 0.5 mile off Port Weller breakwaters.

Upbound vessels from Hamilton to Port Weller, from a position 0.5 mile off Burlington piers, shall lay a course 098° for 28.7 miles to a position 0.5 mile off Port Weller breakwaters.

It is understood that masters may exercise discretion in departing from these courses when ice and weather conditions are such as to warrant it. The recommended courses are shown on chart 14800, Lake Ontario.

Caution.–A special use airspace is in midlake in U.S. waters bounded by the following coordinates: 43°37'N., 76°45'W.; 43°24'N., 76°45'W.; 43°24'N., 78°00'W.; and 43°37'N., 78°00'W. The area may be used for military purposes from the surface to an altitude of 50,000 feet. The using agency is the Commander, 21st Air Div., Hancock Field, Syracuse, N.Y. Consult Local Notice to Mariners for additional information and firing schedules.

Pilotage.–The waters of Lake Ontario are Great Lakes undesignated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great lakes undesignated waters. The Welland Canal and its approaches are Great Lakes designated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. Registered pilots for Lake Ontario and Welland Canal are supplied by the Great Lakes Pilotage Authority, Ltd., St. Catharines. (See appendix for address.) Pilot exchange points are off Cape Vincent, N.Y., 1 to 2 miles N of Port Weller, and at the S end of Welland Canal 1 to 2 miles S of Port Colborne. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

Principal ports.–The principal ports on Lake Ontario are at Oswego and Rochester, N.Y., and at Hamilton and Toronto, Ont. These harbors have been improved by dredging by the United States and Canadian governments, respectively, and provide access for vessels up to 26-foot draft. At Cape Vincent, N.Y., a harbor protected by a breakwater provides refuge for vessels who find that storm conditions render it unsafe to venture into the open lake from the head of St. Lawrence River. The largest drydock on Lake Ontario is at Port Weller in the Welland Canal.

Chart 14802.–The shoreline SE for about 11 miles from Tibbetts Point to Point Peninsula is irregular, with numerous bays and outlying islands and shoals.

Tibbetts Point, 3 miles SW of Cape Vincent, N.Y., is on the S side of the main ship channel leading from the St. Lawrence River to Lake Ontario. **Tibbetts Point Light** (44°06.0'N., 76°22.2'W.), 69 feet above the water, is shown from a white conical tower on the point; a radiobeacon is at the light. Reefs extend off about 1,000 feet around the point, and a rock ledge, with a least depth of 18 feet near its outer end, extends about 1 mile SW from the point. A lighted buoy marks the SW end of the ledge.

Wilson Point is about 1 mile SE of Tibbetts Point and is separated from it by **Fuller Bay,** which extends inshore about 0.5 mile. A rocky spit, with 11 feet near its outer end and shoaler water inside, extends about 0.6 mile SW from Wilson Point. **Wilson Bay,** a rectangular indentation about 1 mile long and 0.5 mile wide, opens between Wilson Point on the N and **Dablon Point** on the S. The bay has depths of 10 to 20 feet, but the deep water at the entrance narrows between the spit extending from Wilson Point and a shallow bank extending 0.9 mile W from Dablon Point. This bank has a depth of 11 feet at the outer end and a 4-foot spot 0.65 mile W of Dablon Point.

Mud Bay, a narrow, shallow inlet about 1.4 miles long, is E of Dablon Point with **Baird Point** on its S side.

Grenadier Island, 2.3 miles long and 1.4 miles in maximum width, is 0.8 mile SW of Baird Point. **Fox Island,** E of Grenadier Island, is irregularly shaped, about 0.8 mile across at its S end and quite narrow at its N end. Between Fox Island and Grenadier Island is a shallow passage about 0.6 mile wide, with depths of 6 to 8 feet. An expanse of shallow water with mud bottom separates both islands from the shore. The shallow water extends off the SW side of the islands as much as 1.2 miles and extends SE to Point Peninsula.

Allan Otty Shoal, about 4.7 miles SW of Tibbetts Point Light, is a narrow ridge about 0.5 mile long E and W, with rocks covered 10 feet along the N edge. A lighted buoy marks the SE side of the shoal.

Charity Shoal, East Charity Shoal, and **South Charity Shoal,** 5 to 6 miles W of Grenadier Island, form a group of outlying rock obstructions in the approach to the S channel of the St. Lawrence River.

Charity Shoal, the northernmost, is a narrow rocky ledge about 0.7 mile long and 0.25 mile wide, with a least depth of 2 feet near its center. A buoy marks the W side of the shoal.

East Charity Shoal, SE of Charity Shoal, has a least depth of 10 feet and is marked by a light. The passage between Charity and East Charity Shoals is rendered unsafe by South Charity Shoal, a narrow ridge about 0.9 mile SW of East Charity Shoal Light, having a least depth of 11 feet. The SW extremity of South Charity Shoal is marked by a lighted buoy. About 3.7 miles SSW of South Charity Shoal, a detached 27-foot shoal is marked by a lighted buoy. An unmarked shoal with a least depth of 25 feet is about 5.5 miles SW of South Charity Shoal.

East Charity Shoal Traffic Lighted Buoy is about 1.5 miles SE of East Charity Shoal Light. Vessels bound from and to the S channel of the St. Lawrence River should pass close on this buoy and well to the E and S of East Charity Shoal Light.

Charts 14802, 14811.–Point Peninsula (44°00'N., 76°15'W.), an almost detached body of land about 6 miles long and 3 miles wide, is joined to the mainland on its NW side by a narrow neck. Shoaling extends as much as 1.2 miles off the W side and around the S end. A lighted buoy 1 mile S of the SW end of the peninsula marks the S side of the shoaling. Between the SE side of the peninsula and **Pillar Point** on the mainland opposite, a deep channel extends NE to Chaumont and Guffin Bays. The channel has general depths greater than 30 feet except for a shoal with depths of 22 to 28 feet which generally parallels the SE end of the peninsula.

Between Point Peninsula and Stony Point, 8 miles S, a group of large deep bays, including Chaumont Bay, Guffin Bay, Black River Bay, and Henderson Bay, open to the N and E.

Chaumont Bay, about 20 miles by deep water from Tibbetts Point, is separated from Lake Ontario by Point Peninsula and the adjoining mainland point. It is a large and well-protected area with depths of 18 to 30 feet of water to within 0.4 mile of shore, except for shoals in the SW end and shoals extending about 1.5 miles SE from Three Mile Point on the N side of the bay. The bay provides good anchorage, mud bottom.

Three Mile Bay, N.Y., is a village at the N end of **Three Mile Bay,** a small bay on the N side of Chaumont Bay. In 1977, the reported controlling depth through the bay to the village was 3 feet, thence 2 feet to and in the marina. Gasoline, ice, marine supplies, a launching ramp, and limited repairs are available.

At the NE end of Chaumont Bay, **Independence Point** extends from the mainland to form two arms, the NE end of Chaumont Bay on the NW side of the point and **Sawmill Bay** on the SE side. **Johnson Shoal,** with a least depth of 2 feet, extends SW for about 1.4 miles from Independence Point and is marked on the SE side by a lighted buoy.

Chaumont, N.Y., a village at the NE end of Chaumont Bay, can be approached on the NW side of Independence Point or through Sawmill Bay on the SE side of the point. The Sawmill Bay approach is marked by a light on the SE side of Independence Point, and deep water in the harbor is marked by buoys and a daybeacon.

The **Chaumont River** flows through the village and into Chaumont Bay on the NW side of Independence Point. A fixed highway bridge at the mouth of the river has a clearance of 20 feet, and an overhead telephone cable on the N side of the bridge has a clearance of 22 feet. The pier remains of a railroad bridge 0.1 mile NE provide a horizontal clearance of 50 feet. An overhead cable of unknown clearance crosses the river at the pier remains.

Small-craft facilities.–Several marinas provide limited transient berths, gasoline, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, a 25-ton marine railway, mobile lifts to 25 tons, a mast-stepping crane, and hull and engine repairs. In 1977, the reported controlling depths were 5 to 10 feet to the Sawmill Bay facilities with 5 to 8 feet alongside, and 5 feet to the facilities above the highway bridge crossing Chaumont River.

Chaumont has several stone quarries.

Guffin Bay is E of Chaumont Bay and is separated from it by **Point Salubrious** and Cherry Island. The bay has good water except for about 0.5 mile of its head, where **Guffin Creek** enters. The deep portion affords good anchorage in 22 to 36 feet with mud bottom.

Cherry Island, on the W side of Guffin Bay, is marked by a light on the SW end. The passage between the NE end of Cherry Island and Point Salubrious is about 0.5 mile wide with depths of 15 to 19 feet except for a detached 11-foot shoal about 650 feet off Point Salubrious.

Black River Bay, opening about 6 miles E of the SW end of Point Peninsula, is entered between **Everleigh Point** on the N side and **Horse Island** on the S side. The bay is about 1 mile wide and extends NE for about 5.5 miles. The water is deep through the bay and close to the shores except for a very shallow expanse filling the upper 1.5 miles. **Black River** enters at the head of the bay. A depth of about 5 feet can be carried through the shallows and between the submerged ruins of breakwaters at the mouth of the river upstream to the village of Dexter, about 1 mile above the mouth. The channel is marked by private lighted and unlighted buoys that are shifted to mark the best water.

Sackets Harbor, N.Y., is on the SE side of Black River Bay, about 22 miles by water from Tibbetts Point. The harbor, about 7 acres in extent, is protected on the N side by **Navy Point.** Lights on the N side of Horse Island and on Navy Point mark the approach to the harbor. In 1976, the controlling depth in the entrance E of Navy Point was 9 feet. In 1977, the harbor basin had a reported controlling depth of 9 feet except for shoaling to 2 feet in the W end. Good anchorage is available with sand, mud, gravel, and rock bottom, taking care to avoid anchoring over the submarine cable in the SE part of the basin. Private mooring buoys extend 082° from Navy Point for approximately 80 yards.

A seasonal **Coast Guard station** is on the S side of the basin.

Augsbury Oil Corp. Sackets Harbor Terminal, on the S side of Black River Bay between Sackets Harbor and Horse Island, has an offshore mooring crib with 400 feet of berthing space and a deck height of about 8 feet. In 1977, depths of 22 feet were reported alongside. The terminal receives petroleum products.

Several marinas at Sackets Harbor provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, mobile lifts to 8 tons, and hull and minor engine repairs. In 1977, depths of 3 to 15 feet were reported alongside the facilities.

Henderson Bay, SW of Black River Bay on the E side of Stony Point, is a broad indentation separated from Lake Ontario by a line of shoals and small islands extending from Stony Point NE to Horse Island. The bay is about 7 miles long and 2 miles wide. Once inside, the bay is clear with depths of 20 to 40 feet close to the shore except at the E end. Shoals extend 0.7 mile SW from Horse Island and continue S to **Campbell Point** where a shoal with a least depth of 2 feet extends about 1 mile W. The bay provides good anchorage, mainly sand and mud bottom.

Bass Island, 1.5 miles SW of Horse Island, and **Gull Island,** 0.9 mile SSW of Bass Island, are on a very small bank that extends 0.2 mile NE from Bass Island and 0.5 mile SW from Gull Island. The deep channel between the shoals off Horse and Bass Islands, about 0.7 mile wide, is the NE entrance to Henderson Bay.

A partly submerged projection of land extends about 2 miles NE from Stony Point and terminates in **Six Town Point. Lime Barrel Shoal,** with a least depth of 1 foot, is the NE end of shallow water that extends 1.2 miles NE from Six Town Point. A lighted buoy on the W side of the shoal marks a small-craft passage with depths of 11 to 14 feet between Lime Barrel Shoal and Six Town Point. A deepwater passage between Lime Barrel Shoal and Gull Island has depths of 23 to 33 feet.

Henderson Harbor is a small summer resort on the NE side of **Henderson Harbor,** a small inlet at the S end of Henderson Bay. In May 1977, the reported controlling depth to marinas in the S end of the harbor was 4 feet with 2 to 10 feet reported alongside the berths. The marinas provide transient berths, gasoline, diesel fuel, water, electricity, ice, sewage pump-out, marine supplies, launching ramps, mobile lifts to 15 tons, a 45-foot marine railway, and hull, engine, and electronic repairs.

Special anchorages are in Henderson Harbor. (See **33 CFR 110.1 and 110.87,** chapter 2, for limits and regulations.)

Whites Bay, with good depths, and **Snow Shoe Bay,** small and shallow, are indentations in the W shore of Henderson Bay NW of Henderson Harbor. A privately maintained channel connecting Snow Shoe Bay with Lake Ontario has depths of about 3 feet through a cut in the narrow peninsula on the NE side of Stony Point. A bridge across the channel has a 30-foot fixed span with a clearance of 12 feet.

Chart 14802.–Stony Point (43°52.8′N., 76°15.6′W.) is a bold headland extending W from Henderson Bay with deep water close-to. **Stony Point Light** (43°50.3′N., 76°17.9′W.), 30 feet above the water, is shown from a white skeleton tower with a triangular red daymark on the W end of the point.

Stony Island is about 2.2 miles NW of Stony Point. The channel between the mainland and the island is broad and deep and is occasionally used by tows bound to and from the St. Lawrence River. A rocky ledge with least depths of 2 feet extends about 2.3 miles SW from Stony Island. **Calf Island** is on the W part of the ledge, and the SW end of the ledge is marked by a buoy. A detached rock ledge with a least depth of 13 feet is about 1 mile S of the buoy. A shoal with a least depth of 14 feet extends 0.4 mile off the NE end of Stony Island and is marked on the E side by a lighted buoy. **Dutch John Bay** is a small bight of deep water on the W side of Stony Island.

From the head of the bay, a narrow strip of water extends SW almost through the length of the island.

Little Galloo Island, about halfway between the SW ends of Stony and Galloo Islands, is on a bank 1 mile long and 0.5 mile wide, with broad and deep channels to either side. A detached 24-foot spot is in the channel SW of the island.

Galloo Island is 2.4 miles W of Stony Island. **Gill Harbor,** on the NE side of Galloo Island, provides shelter for small craft. The harbor is enclosed by a gravel spit across which a channel has been dredged. In 1961, the controlling depth was 7 feet in the entrance channel.

North Pond, near the N end of the island, has a depth of 3 feet. The entrance is through a narrow channel along a crib pier at the E end of the pond. In 1976, the controlling depth was 2 feet in the entrance.

Shoals extend about 0.6 mile off the NE and SW ends of the island.

Galloo Island Light (43°53.3'N., 76°26.7'W.), 58 feet above the water, is shown from a gray conical tower at the SW end of the island.

Galloo Shoal, about 1.3 miles W of Galloo Island Light, has a least depth of 3 feet, and is marked off its W side by a lighted buoy. Vessels bound to and from the St. Lawrence River should pass W of the buoy, although there is a deep passage about 0.8 mile wide between the shoal and Galloo Island.

An unmarked snag, covered 16 feet, is 0.4 mile NE of Galloo Shoal, and an unmarked wreck is 1 mile NE of the shoal.

Charts 14802, 14803.–From Stony Point the coast trends generally S for about 22 miles, and thence W for about 7 miles to Nine Mile Point. **Mexico Bay** is the broad, open formation in the bend E of Nine Mile Point.

The shoreline, for about 4 miles SE of Stony Point, is a series of irregular indentations with a rocky bank extending as much as 0.9 mile offshore. About 4.5 miles SE of Stony Point, **Drowned Island,** covered 1 foot, is on a bank that extends 1 mile offshore.

Chart 14803.–The lakeshore S of Drowned Island is relatively straight for about 17 miles with deep water about 1 mile off. In this stretch, several shallow ponds, fed by numerous creeks, are practically cut off from the lake by narrow ridges of shore.

North Pond, about 13 miles S of Stony Point, is separated from the lake by a long, narrow neck of land. The narrow, continually shifting entrance channel had a reported controlling depth of 3 feet in 1977. Local knowledge is advised. The pond, about 3.5 miles long and 2 miles wide, has depths of 6 to 13 feet with shoaling to lesser depths along the shore and on the N, E, and S sides. Several marinas on the pond provide berths, gasoline, ice, marine supplies, sewage pump-out, launching ramps, a 3-ton mobile hoist, and engine and hull repairs. In 1977, depths of 2 to 4 feet were reported alongside the berths.

Sandy Pond is a village at the S end of the pond.

Selkirk, at the mouth of the **Salmon River,** is about 20 miles S of Stony Point. The Salmon River has depths of 3 to 6 feet, but a shifting sandbar at the entrance limits drafts to about 2 feet.

Little Salmon River enters the SE side of Mexico Bay. The town of **Texas** is 1 mile above the mouth.

In Mexico Bay, from Selkirk to **Nine Mile Point** (43°31.5'N., 76°22.0'W.), the bottom is rock, and deep water is within 1 mile of the shore. The headland W of Nine Mile Point is relatively deep-to, and SW to Oswego shallow water extends no more than 1 mile offshore.

The James A. FitzPatrick Nuclear Power Plant and the Niagara Mohawk Power Corp. Nine Mile Point Nuclear Station are on the headland W of Nine Mile Point.

Charts 14803, 14813, 14786.–Oswego Harbor, at the mouth of the **Oswego River,** is on the S shore of Lake Ontario about 15 miles from its E end and about 45 miles S of Tibbetts Point at the head of the St. Lawrence River. The harbor serves the city of **Oswego, N.Y.,** and is the terminus of the Oswego Canal of the **New York State Barge Canal System.** The harbor comprises an outer breakwater harbor of refuge and an inner terminal harbor in the Oswego River. Because most of the very severe storms are from the W and NW, with a fetch the entire length of the lake, the outer harbor is an important harbor of refuge for vessels in this part of the lake.

An unmarked **dumping ground** with a least reported depth 35 feet is about 1.5 miles NNW of the entrance of Oswego Harbor.

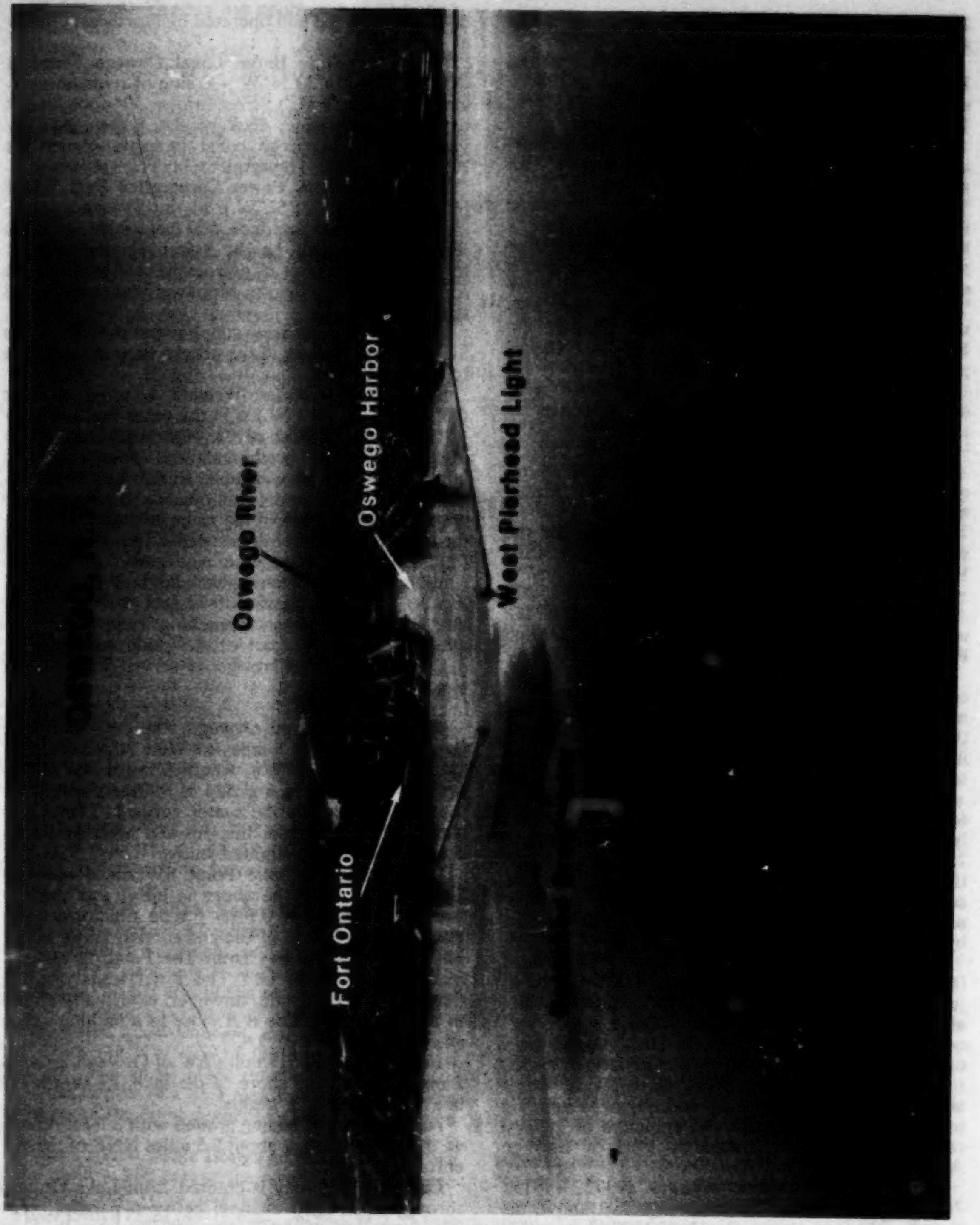
Prominent features.–The strobe-lighted stacks at the powerplant 1 mile W of the river mouth are prominent in the harbor approach.

Channels.–A dredged approach channel leads E from the lake S of a detached breakwater and between converging breakwaters into the outer harbor of refuge. From the outer harbor, the inner harbor extends up the Oswego River for 0.5 mile along the Oswego piers. Another channel, protected by an extension of the W breakwater, extends SW from the outer harbor along the shore to a turning basin. The breakwaters are marked by lights, and the channels by lighted and unlighted buoys. A radiobeacon is at the light on the west breakwater.

In May 1984, the controlling depths were 26 feet at midchannel in the approach channel, thence 24 feet in the channel through the outer harbor, thence 21 feet in the river channel to the head of the project at Seneca Street.

The outer harbor W of the entrance channel had depths of 18 to 21 feet except for shoaling to 2½ feet along the W breakwater. The outer harbor E of the entrance channel had depths of 19 to 21 feet except for shoaling to 16 feet along the SE edge; the SE portion of the harbor is not being maintained. The channel to the turning basin had a controlling depth of 20 feet at midchannel and thence, 15 to 21 feet in the basin with lesser depths along the edges; the S portion of the channel was not being maintained.

In November 1983, a large anchor was reported


Oswego River
Oswego Harbor
West Pierhead Light
Fort Ontario

lost in the W part of the outer harbor in about 43°28'03"N., 76°31'04"W.

A dangerous 3-foot spot is off the E face of the Port of Oswego Authority Grain Wharf at the W side of the mouth of the river in about 43°27'53"N., 76°30'53"W. Caution is advised.

Mooring vessels to the breakwaters, and anchoring in the outer harbor where it will interfere with navigation, are prohibited.

The Oswego Canal of the New York State Barge Canal System enters Oswego Harbor through a dredged canal on the E side of the Oswego River above the Bridge Street bridge. This bridge has a clearance of 26 feet above normal pool level, New York State Barge Canal System datum. (For information on the Oswego Canal, see chapter 14, Hudson River, New York Canals, and Lake Champlain.)

Dangers.–It is reported that during flood river conditions currents in the river attain velocities up to 5 mph (4.3 knots).

Oswego is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Oswego has a hospital.

Oswego Coast Guard Station is on the S side of the outer basin 0.2 mile W of the mouth of Oswego River.

Wharves.–Oswego has deep-draft facilities in the outer harbor and in the Oswego River. All wharves have highway connections. The alongside depths for the facilities described are reported depths; for information on the latest depths, contact the operator.

Port of Oswego Authority Grain Wharf (43°27'56"N., 76°31'00"W.): S shore of the outer harbor 500 feet W of the river; 1,000-foot pier; 22 to 23 feet alongside the E face, 15 to 21 feet alongside the W face; deck height, 5 feet; 28,000 square feet covered storage; 1-million-bushel grain elevator; receipt of petroleum and grain; owned and operated by Port of Oswego Authority.

Port of Oswego Authority East Side Wharf (43°27'50"N., 76°30'43"W.): E side of Oswego River just inside the mouth; 1,700-foot wharf; 25 feet alongside; deck height, 5 feet; 100,000 square feet covered storage, 36,000 square feet covered bulk cargo storage, 9.2 acres open storage; cranes to 200 tons; four bucket loaders; rail connections; water and electrical connections; receipt of aluminum ingots and potash, receipt and shipment of general cargo; owned and operated by Port of Oswego Authority.

Northeastern Cement Wharf (43°27'41"N., 76°30'46"W.): W side of river 1,500 feet above the mouth; 340-foot marginal wharf, 500 feet usable using adjacent property; 25 feet alongside; deck height, 5 feet; pipelines extend to cement silos, 22,390-ton capacity; freshwater connections; receipt of cement; owned and operated by Northeast General Portland, Inc.

New York State Barge Canal Oswego Terminal (43°27'28"N., 76°30'34"W.): E side of river immediately N of the Bridge Street bridge; 594-foot face; 7 to 14 feet alongside; deck height, 8 feet; used by vessels awaiting barge canal lockage; owned by New York State Department of Transportation.

Niagara Mohawk Power Corporation Fuel Wharf (43°27'37"N., 76°31'52"W.): at the SW end of the outer harbor; 400-foot face, 560 feet usable; 10 to 21 feet alongside; deck height, 8 feet; pipelines extend to four tanks; receipt of petroleum products; owned and operated by Niagara Mohawk Power Corporation.

Supplies.–Some marine supplies and provisions are available at Oswego. Tank trucks deliver diesel oil to most wharves.

Small-craft facilities.–**Wrights Landing Marina** (43°27.5'N., 76°31.1'W.) is in the outer harbor about 1,200 feet W of Port of Oswego Authority Grain Wharf. Over 40 berths, sewage pump-out, and launching ramps are available. In April 1985, depths of 8 feet were reported alongside the berths. A marina on the E side of the river 0.3 mile above the mouth provides transient berths, gasoline, diesel fuel, electricity, water, ice, sewage pump-out, marine supplies, a 20-ton hoist, and hull and engine repairs. In 1977, depths of 10 feet were reported alongside the berths. Launching ramps are also available in the W part of the outer harbor.

Communications.–Oswego is served by rail and bus.

Chart 14803.–From Oswego, the bold shoreline runs SW for about 7 miles to **West Ninemile Point** (43°24.8'N., 76°37.8'W.). About 3 miles NE of this point is **Ford Shoals,** a group of boulders and stony mounds just below the water surface. The shoals extend about 0.7 mile offshore and are marked on the NW side by a lighted buoy.

From West Ninemile Point SW for 6 miles to Little Sodus Bay, the shore is hilly, and shallow water extends from 0.5 to 1 mile offshore. **Sabin Point,** on the E side of the entrance to Little Sodus Bay, separates the bay from **The Pond.** A channel from Lake Ontario into The Pond leads under a fixed bridge. The Pond, however, is virtually closed to navigation, because it is close to a bathing beach and the bridge.

Little Sodus Bay, 13 miles SW of Oswego, extends 2 miles S from the shore of the lake. Its shores are bold, except in the bights.

An unmarked **dumping ground** with a least reported depth of 35 feet is about 2.5 miles NNE of the bay entrance.

Channels.–The bay is entered from Lake Ontario through a dredged channel between parallel piers. The inner end of the E pier extends laterally E to enclose the bay. In 1984, the controlling depth was 8 feet. The outer ends of the piers are marked by lights.

Anchorages.–The bay has good anchorage in 24 to 36 feet, clay bottom.

Dangers.–With W winds, a strong current runs across the outer end of the entrance piers. Avoid being set E of the pierheads where the bottom is hardpan with no holding ground.

In July 1981, shoaling to 5 feet was reported on the W side of the bay in the vicinity of **Grass Island** in about 43°20′18″N., 76°42′36″W. The shoal is reported to be shifting E.

Small-craft facilities.–A pier, with reported depths to 12 feet alongside, at the NE end of the bay at Fair Haven Beach State Park provides sewage pump-out, marine supplies, and a launching ramp. Marinas in the S end of the bay provide transient berths, gasoline, water, ice, electricity, launching ramps, mobile lifts to 12 tons, a mast-stepping crane, and emergency shaft and propellor repairs. In 1977, depths of 4 to 10 feet were reported alongside the berths.

Charts 14803, 14804.–From Little Sodus Bay, the shore trends SW for about 14 miles to Sodus Bay. The shore is hilly, and a rock bank extends a maximum of about 1 mile offshore.

Blind Sodus Bay, just W of Little Sodus Bay, is separated from Lake Ontario by a narrow strip of land. The bay has a maximum depth of about 21 feet.

Port Bay is about halfway between Little Sodus and Sodus Bays. A privately maintained and marked channel enters the bay from Lake Ontario and is protected on the W by a short pier and fill. In August 1976, the controlling depth in the channel was 2 feet. The entrance is extremely difficult to make in rough weather. An overhead cable with an unknown clearance crosses the entrance channel. Good water is available inside the bay. Transient berths, gasoline, water, electricity, and a launching ramp are available in the bay.

Chart 14804.–**East Bay,** about 4 miles E of Sodus Bay at the mouth of **Mudge Creek,** is small and shallow and closed to lakeward.

Charts 14804, 14814.–**Sodus Bay,** also known as **Great Sodus Bay,** is 27 miles SW of Oswego. The shores of the bay are bold, and the depths are from 18 to 48 feet, generally to within 0.2 to 0.4 mile of the shore. The SE arm of the bay has depths of 9 to 15 feet to within 0.1 mile of the shore.

Sand Point, a low sandspit, extends about 0.6 mile ESE from the NW side of the bay just inside the entrance. The small bight on the N side of Sand Point has depths of 1 to 4 feet, but the water at the extremity of the point deepens rapidly to 30 feet and more.

Newark Island, Eagle Island, and **LeRoy Island** are in the shallow NE part of the bay. The first two are deep-to on the W or bay side.

Sodus Outer Light (43°16.6′N., 76°58.5′W.), 51 feet above the water, is shown from a square white pyramidal tower on the N end of the W entrance pier. A radiobeacon is at the light.

An unmarked **dumping ground** with a least reported depth of 35 feet is about 2 miles NE of the entrance to Sodus Bay.

Channels.–A dredged channel extends from deep water in Lake Ontario between parallel piers to the bay. The inner end of the E pier extends laterally eastward to **Charles Point** to enclose the bay. The outer ends of the piers are marked by lights, and the entrance channel is marked by a lighted buoy and a light. In 1984, the channel had a controlling depth of 10 feet from deep water in the lake.

Anchorages.–The bay is the most capacious and secure anchorage along the New York shore. The holding ground is good with a mud bottom. A special anchorage is on the S side of Sand Point. (See **33 CFR 110.1 and 110.86,** chapter 2, for limits and regulations.)

Dangers.–Along the shoreline within Sodus Bay are numerous obstructions, including submerged cribs, dock ruins, submerged piles, and several wrecks, which hamper small-craft navigation.

Sodus Point is a **customs port of entry.**

Sodus Point Coast Guard Station, seasonal, is on the W side of the entrance channel.

Small-craft facilities.–Marinas and boatyards at the village of **Sodus Point, N.Y.,** on the W side of Sodus Bay, provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, a mast-stepping crane, mobile lifts to 50 tons, and hull, engine, and electronic repairs. In 1977, depths of 4 to 20 feet were reported alongside the berths.

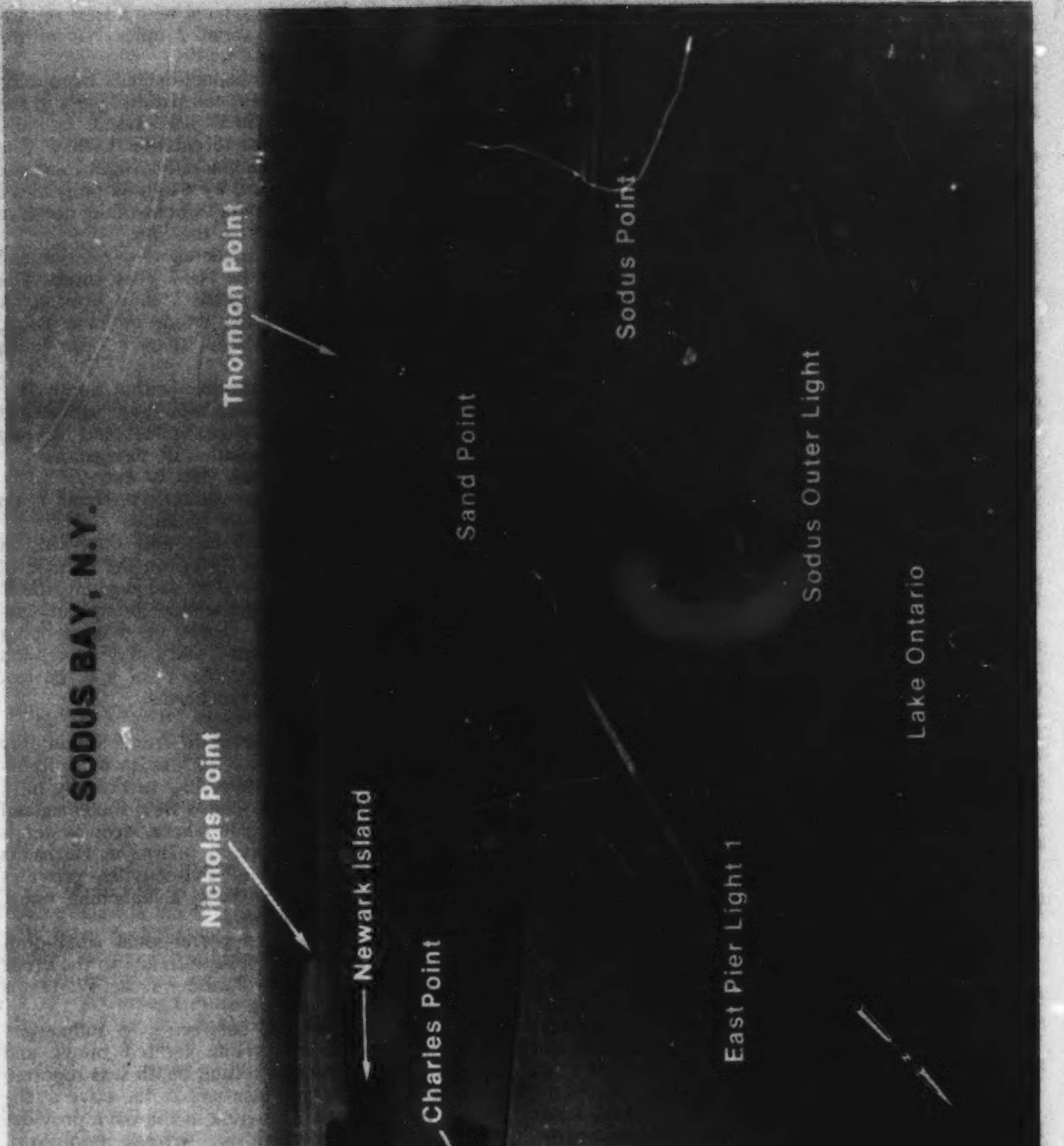
Chart 14804.– The shoreline from Sodus Bay trends generally WNW for 10.5 miles to Pultneyville. The E part of this stretch is marked by hills; for about 3 miles W from Sodus Bay, shoals extend offshore about 0.7 mile. Elsewhere, deep water is less than 0.4 mile offshore. A marina at **Fairbanks Point,** about 2 miles E of Pultneyville, provides gasoline, water, ice, electricity, a launching ramp, and hull and engine repairs.

Pultneyville, N.Y., is a recreational small-craft harbor on **Salmon Creek.** The entrance to the creek is sheltered by a point of land on the W, but is exposed to the N and E.

The entrance channel between two submerged jetties is marked by private lighted buoys and ranges. In 1981, the controlling depth was reported to be 5 feet in the entrance and in the cove at the mouth of the creek. A marina in the cove provides gasoline, water, electricity, sewage pump-out, launching ramps, fixed lifts to 2 tons, and emergency repairs. In 1977, depths of 1½ to 5 feet were reported at the berths.

The shore from Pultneyville continues W for 6.5 miles to **Smoky Point,** thence W for about 6 miles to **Ninemile Point,** and thence SW for 5.5 miles to Irondequoit Bay. Deep water along this stretch is about 0.5 mile offshore.

Irondequoit Bay is about midway between the mouth of the Niagara River and the head of the St. Lawrence River, and about 3.5 miles E of the


SODUS BAY, N.Y.
Thornton Point
Sodus Point
Sand Point
Sodus Outer Light
Lake Ontario
Nicholas Point
Newark Island
Charles Point
East Pier Light 1

Genesee River entrance. The bay is irregularly shaped with hilly shores, and extends inland about 4 miles. It is separated from Lake Ontario by a long, low, narrow sandbar. Shallow water is on both the lake and bay sides of the sandbar. On the bay side, it extends S for about 0.6 mile.

The natural channel connecting with the lake cuts through the bar at the NW corner of the bay. During the summer, this channel is narrow and not more than 1 to 4 feet deep, but during the spring it widens sometimes to 100 feet and deepens to as much as 12 to 15 feet.

Two fixed bridges cross the channel between the lake and the bay. The railroad bridge has a clearance of 8 feet, and the highway bridge has a clearance of 6 feet. A fixed highway bridge with a clearance of 44 feet crosses the bay 1.6 miles S of the entrance channel.

Charts 14804, 14815.–From Irondequoit Bay WNW for 3.8 miles to the mouth of the Genesee River, deep water is about 0.5 mile offshore. A buoy marks a rock covered ½ foot close inshore about 0.7 mile SE of the Genesee River entrance.

Rochester Harbor, at the mouth of the **Genesee River,** is 56 miles W of Oswego Harbor and about 7 miles N of the main business district of the city of **Rochester, N.Y.** The river is navigable for about 5.5 miles above the mouth. The first of a group of dams is about 7 miles upstream from Lake Ontario. There is no navigable connection between the lower portion of the Genesee River and the New York State Barge Canal, which connects with the river about 11 miles upstream from the lake. The surface elevation of the river falls more than 260 feet between the Rochester Terminal of the New York State Barge Canal System and the head of navigation of the lower portion of the river below the dams.

An unmarked **dumping ground** with a least reported depth of 35 feet is about 1.8 miles NE of the mouth of the Genesee River.

Prominent features.–The lighted stacks at the powerplant 1.6 miles WNW of the river mouth, the stacks at the sewage treatment plant 1.9 miles SE of the river mouth, and the tall apartment building 1.1 miles SW of the river mouth are the most prominent objects from offshore.

Rochester Harbor Light (43°15.8'N., 77°36.0'W.), 59 feet above the water, is shown from a red skeleton tower with a red enclosed top on the outer end of the W pier. A fog signal is at the light.

A radiobeacon is at the inner end of the E pier.

Channels.–The river is entered from Lake Ontario through a dredged channel that leads between two piers, thence upstream for 2.6 miles above the mouth. There are two turning basins, one just inside the mouth and the other 2 miles above the mouth on the W side of the channel. The outer ends of the entrance piers are marked by lights, and a buoy marks a shoal that extends into the N part of the upper turning basin.

In 1983-April 1985, the midchannel controlling depth was 20 feet in the approach channel, thence in March-April 1985, 19 feet between the piers to the lower turning basin with 17 to 19 feet in the basin, thence 16 feet at midchannel to the upper turning basin, thence 11 feet at midchannel to the upstream limit of the Federal project. The upper turning basin has shoaling to bare at the N limit and is no longer being maintained.

Mooring is allowed on the lakeside of the piers only.

Anchorages.–(See **33 CFR 162.185 and 207.600,** chapter 2, for regulations.)

Dangers.–It is reported that NE winds sometimes create waves as high as 6 feet which reflect through the entrance channel between the piers, making navigation into the harbor difficult. River currents sometimes compound this problem. A dangerous sunken wreck is 0.8 mile ENE of Rochester Harbor Light.

Bridges.–Two bridges cross the dredged section of the Genesee River. The ConRail bridge 0.9 mile above the pierheads has a swing span with a clearance of 10 feet. The Stutson Street bridge 0.4 mile upstream has a bascule span with a clearance of 24 feet. (See **33 CFR 117.1 through 117.59 and 117.785,** chapter 2, for drawbridge regulations.) Overhead power cables crossing the river 2.8 miles above the pierheads have a clearance of 141 feet. Above the limit of the Federal project, Ridge Road bridge, 5.5 miles above the pierheads, has a fixed span with a clearance of 160 feet. The Driving Park Avenue bridge, 6.4 miles above the pierheads, has fixed span with unknown clearance.

Weather.–(See page T-1 for **Rochester climatological table.**)

Rochester is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Rochester has several hospitals.

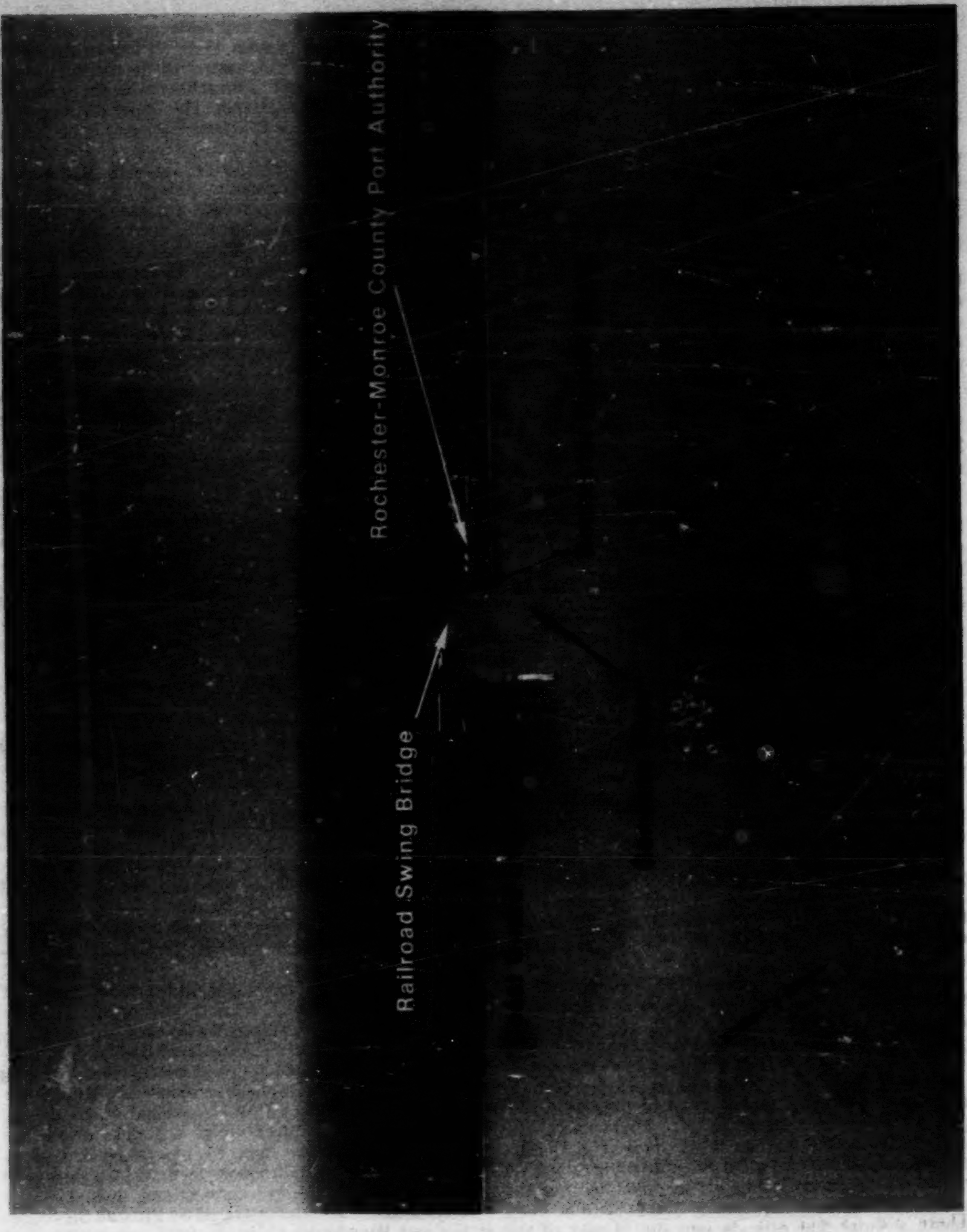
Rochester Coast Guard Station is on the E side of the river just inside the mouth.

A **speed limit** of 6 mph is enforced in Rochester Harbor. (See **33 CFR 162.165,** chapter 2, for regulations.)

Wharves.–Rochester has facilities on both sides of the river for about 3 miles above the mouth. The facilities described have freshwater connections. The alongside depths are reported depths; for information on the latest depths, contact the operator.

The City of Rochester Port of Rochester (43°15'20"N., 77°36'26"W.): marginal wharf on the NW side of the river about 0.3 mile inside the entrance; 1,275-foot face; 9 feet alongside; deck height, 9 feet; 100,000 square feet covered storage; 9 acres open storage; rail connections; owned by the city of Rochester and operated by Pittston Stevedoring and Warehouse Corp. In 1977, this facility had been inactive for 3 years.

Charlotte Docks (43°13'30"N., 77°37'00"W.): on the W side of the river about 2.9 miles above the


Rochester-Monroe County Port Authority
Railroad Swing Bridge

river entrance; 137-foot T-head, 330 feet usable berthage with mooring posts; 13 feet alongside; deck height, 7 feet; 26,000-ton cement silo farm; electrical connections; owned and operated by Rochester Portland Cement Corp.

Supplies.–Some marine supplies, water, provisions, and diesel fuel can be obtained at Rochester.

Small-craft facilities.–Marinas at Rochester provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, mobile lifts to 40 tons, and hull, engine, and electronic repairs. In 1977, depths of 2 to 12 feet were reported alongside the berths.

Communications.–Rochester is served by rail, air, and bus. Rochester-Monroe County Airport is about 10 miles SSW of the river entrance.

Charts 14804, 14805.–Anchorage with good protection from W winds is available between the mouth of the Genesee River and **Braddock Point** (43°19.4'N., 77°42.9'W.), about 7 miles NW. Adequate depths are found within 1 mile offshore. Numerous potable water intakes are within 2.5 miles NW of the Genesee River and a dangerous wreck covered 1.4 feet is 0.2 mile offshore in about 43°17.6'N., 77°40.2'W.; caution is advised. A 14-foot shoal is centered about 1.2 miles offshore extending from about 43°18.5'N., 77°40.5'W. to 43°18.8'N., 77°39.5'W., with a width of about 600 yards. The shore is low and consists mostly of bars enclosing a series of shallow ponds or enlarged outlets of creeks.

Chart 14805.–Braddock Bay, just SE of Braddock Point, is separated from Lake Ontario by long necks of land extending from the SE and from the NW with an entrance between. The entrance is marked by lights, and the channel through the bay is marked by private lights along the midchannel line. In 1984, the reported controlling depth across the entrance bar was 2 feet. Several marinas in the bay provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, lifts to 14 tons, and hull, engine, and electronic repairs. In 1977, depths of 4 to 5 feet were reported alongside the berths.

Braddock Point Light (43°20.5'N., 77°45.7'W.), 55 feet above the water, is shown from a white skeleton tower with a red and white diamond-shaped daymark on **Bogus Point,** 2.7 miles NW of Braddock Point.

For 2 miles W of Braddock Point Light, a boulder bank with rocks just below the water surface near its outer edge extends about 0.8 mile from the shore. A dangerous wreck is about 1 mile offshore 1.9 miles NW of Braddock Point Light.

The shoreline W to **Devils Nose** (43°22.1'N., 77°58.6'W.), a small bold knob 11 miles W of Bogus Point, has deep water 0.5 mile off, except for 7-foot depths extending 0.5 mile off just E of Devils Nose. There are no outlying obstructions from Devils Nose to Point Breeze, 11 miles W, except for a rock ledge covered 5½ feet about 0.6 mile offshore, 1.5 miles E of Point Breeze.

Point Breeze Harbor is at the mouth of **Oak Orchard Creek.** The village of **Point Breeze, N.Y.,** is on the E side of the harbor. The approach to the creek from Lake Ontario is through two dredged channels that lead around either end of a detached breakwater, join, and lead S between two jetties through the mouth of the creek to a harbor basin with its upper end about 0.2 mile above the mouth. Lights mark the detached breakwater and the jetties, and buoys mark the approach channels. A radiobeacon is at the light on the E jetty. In August 1985, the controlling depth was 5½ feet in the W approach channel, and 4½ feet in the E approach channel, thence 8 feet in the jettied channel with 7 to 8 feet in the basin except for shoaling along the W edge.

Caution.–In May 1977, it was reported that several vessels have grounded on the detached breakwater when entering at night. Local knowledge is advised.

Twin fixed highway bridges with clearances of 54 feet, and a fixed highway bridge with a clearance of 8 feet, cross Oak Orchard Creek about 0.8 mile and 1.7 miles above the detached breakwater, respectively.

Several marinas at Point Breeze provide transient berths, gasoline diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, mobile lifts to 25 tons, and hull, engine, and electronic repairs.

From Point Breeze 15 miles W to Thirtymile Point, shallow water with a rocky bottom extends from 0.3 to 0.6 mile offshore. From about 2.5 to 3.5 miles E of Thirtymile Point, depths of 6 to 8 feet are about 0.5 mile offshore.

Charts 14806, 14805.–Thirtymile Point Light (43°22.5'N., 78°29.3'W.), 72 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on **Thirtymile Point.** A radio mast is 50 feet SW of the light.

Charts 14806, 14810.–From Thirtymile Point, the shoreline trends SW for about 12 miles to Olcott, thence about 6 miles to Wilson, and continues SW for about 12.3 miles to the mouth of the Niagara River. From Thirtymile Point to about 2.4 miles W of Olcott, deep water is within 0.3 mile of the shore, but from the latter point to near the mouth of Niagara River, the bank extends about 0.7 mile from shore.

Olcott, N.Y., is a village at the mouth of **Eighteenmile Creek.**

An unmarked **dumping ground** with a least reported depth of 35 feet is 1.5 miles N of the creek entrance.

The creek is entered from Lake Ontario through a dredged channel between two piers. The W pier is marked by a light. In August 1985, the controlling depth was 7 feet in the dredged channel. The channel, however, is unstable because of mud deposits from Eighteenmile Creek and drifting sand from the W. A rock ledge with a least depth of 10 feet is across the entrance channel 500 feet lakeward of the piers. In May 1983, an obstruction covered 3 feet was reported on the W side of the channel in about 43°20′13.5″N., 78°43′00.9″W.

An overhead telephone cable with a clearance of 56 feet and a fixed highway bridge with a clearance of 52 feet cross the creek about 0.2 mile and about 0.4 mile above the mouth, respectively.

Several marinas in the creek provide transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, a lauching ramp, a 30-ton mobile lift, and hull, engine, and electronic repairs. In 1977, depths of 6 to 11 feet were reported alongside the berths.

In September 1981, a submerged rock was reported about 3.3 miles W of Olcott in about 43°19′56″N., 78°47′00″W.

Charts 14810, 14806, 14822.–**Wilson Harbor** is in the mouth of **East Branch Twelvemile Creek,** about 12 miles E of the mouth of the Niagara River. The widened mouth of the creek forms **Tuscarora Bay,** which is about 2 feet deep in its natural depth and provides good anchorage for shallow-draft vessels.

An unmarked **dumping ground** with a least reported depth of 35 feet is 1.3 miles N of the harbor entrance.

The entrance to the harbor from Lake Ontario is through a dredged channel that leads between parallel piers and thence upstream for 0.8 mile through Tuscarora Bay. The W pier is marked by a light, and daybeacons mark the channel through Tuscarora Bay. In August 1985, the controlling depth was 7 feet in the entrance channel, thence 5 feet in the channel through Tuscarora Bay.

Overhead cables with clearances of 65 and 75 feet cross the bay about 0.3 and 0.7 mile above the mouth, respectively.

Several marinas in Tuscarora Bay provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, a 25-ton mobile hoist, and hull, engine, and electronic repairs. In 1977, depths of 4½ to 10 feet were reported alongside the berths.

Charts 14806, 14810, 14822, 14816.–**Niagara River Below Niagara Falls.**–The Niagara River flows from the NE end of Lake Erie and enters Lake Ontario about 36 miles from its W end. The Lake Ontario entrance to the river is between two land points occupied by **Fort Niagara, N.Y.,** on the E, and **Fort Mississauga, Ont.,** on the W. The **International boundary** between the United States and Canada generally follows a middle of the river course through the lower Niagara River.

The Niagara River, with its great volume of water and a current of about 2.5 mph (2.2 knots), deposits considerable sediment in Lake Ontario and forms extensive shoals for a radius of about 3 miles off the mouth of the river. A bank with least depths of 5 feet extends about 0.8 mile off the E side of the entrance and is marked on its NW side by a lighted bell buoy. **Rumsey Shoal,** with depths of 17 feet, is an unmarked detached shoal about 1.5 miles N of Fort Niagara. **Niagara Bar** extends from shore about 2 miles W of the river mouth NE to a point about 3 miles N of the river mouth. The N part of the shoal has depths of 12 and 13 feet, but depths of 8 feet are found to about 1.5 miles offshore NW of the river mouth. Commercial sand and gravel dredging is conducted intermittently in the area and depths are subject to change. In August 1982, an obstruction covered 3 feet was reported in about 43°16′00″N., 79°05′12″W. Vessels bound between the Welland Canal and points E of the Niagara River must avoid Niagara Bar by passing N of the lighted buoy about 3.7 miles N of Fort Niagara.

The entrance to the Niagara River is marked by lighted buoys, a **149°30′** lighted range, and lights at Fort Niagara and Fort Mississauga. **Fort Niagara Light** (43°15.7′N., 79°03.6′W.), 91 feet above the water, is shown from a gray octagonal tower, upper part yellow, from Fort Niagara on the E side of the river just inside the mouth.

At the prevailing stages during the navigation season, a depth of about 13 feet may be carried into the river by closely following the lighted range. An alternate approach is on course **187°**, avoiding the E edge of Niagara Bar and leaving the lighted bell buoy marking the bank off Fort Niagara close aboard to port, and then swinging for the river when on the lighted range.

Once inside the river, an unobstructed channel with depths of 30 to 70 feet leads to Lewiston at the foot of the rapids below Niagara Falls, about 7 miles above the mouth.

Niagara Coast Guard Station is on the E side of the Niagara River entrance. In 1977, depths of 14 feet were reported alongside the Coast Guard wharf.

Niagara-on-the-Lake, Ont., is on the W side of the mouth of the river. A **Canadian customs reporting station** is at Niagara-on-the-Lake. (See Canadian Customs, chapter 1.) The customs wharf has depths of 4 to 10 feet alongside. -

A small-craft basin immediately S of the customs wharf provides gasoline, diesel fuel, sewage pump-out, a 25-ton marine railway, a 20-ton hoist, and hull and engine repairs. Depths of 2 to 5 feet are reported in the basin. Mariners are cautioned that strong winds tend to raise or lower the water level in the basin by as much as 2 feet.

Youngstown, N.Y., is on the E side of the river about 1 mile above the mouth.

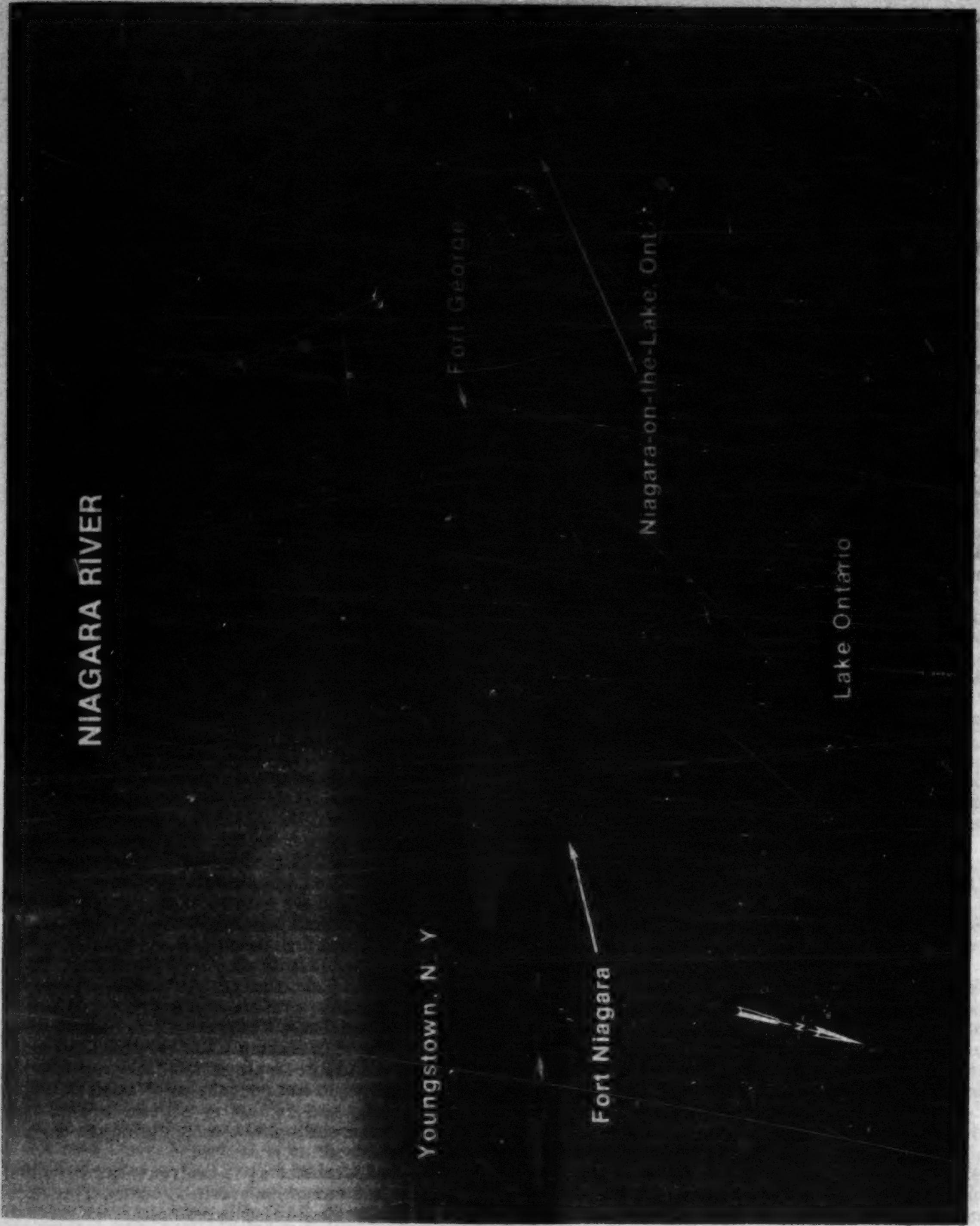
A **special anchorage** is on the E side of the river at Youngstown. (See **33 CFR 110.1 and 110.85,** chapter 2, for limits and regulations.)

Youngstown is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Several marinas at Youngstown provide transient berthage, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, a launching ramp, mobile lifts to 20 tons, and hull and engine


NIAGARA RIVER
Fort George
Niagara-on-the-Lake, Ont.
Lake Ontario
Youngstown, N. Y.
Fort Niagara
N

repairs. In 1977, depths of 6 to 14 feet were reported alongside the berths.

A Canadian **anchorage area** is on the W side of the river about 2 miles above the mouth.

Lewiston, N.Y., on the E side of the river about 7 miles above the mouth, is the head of navigation on the lower Niagara River. In 1977, the village dock, reported to be in poor condition, had depths of 12 feet alongside.

Queenston, Ont. is on the W side of the river opposite Lewiston. Sand is received at a 300-foot wharf owned and operated by D. G. Bawtinheimer, Ltd. In 1977, depths of 12 feet were reported alongside.

The portion of the lower Niagara River upstream from Lewiston and Queenston to **American Falls** and **Horseshoe Falls** is considered not navigable because of a 4-mile section of heavy rapids. Several bridges and overhead cables cross this section of the river.

Charts 14806, 14810, 14822, *2063.–From the International boundary at the Niagara River, the Canadian shoreline extends W for 2.9 miles to **Four Mile Point,** thence SW for 11.5 miles past Port Weller and Port Dalhousie, and thence WNW for 25 miles to Hamilton Harbour at the W end of the lake. SW from Four Mile Point, deep water is about 0.7 mile offshore to the Port Weller entrance where the shoals extend 1.2 miles off. From Port Weller W to Hamilton Harbour, deep water is 0.5 to 1.5 miles offshore.

A **danger area** of the Niagara-on-the-Lake Small Arms Range extends about 1.1 miles offshore, about 2 miles W of the mouth of the Niagara River. The intermittent use of the area is announced by local Canadian Coast Guard Marine Radio Broadcast and may also be advertised in local newspapers. The danger area is marked by buoys. (For details, consult the Annual Edition of Canadian Notices to Mariners.)

Charts *2042, 14810, 14822.–Port Weller Harbour, Ont.,, 8 miles SW of the Niagara River mouth, is the Lake Ontario terminus of the Welland Canal. The St. Lawrence Seaway Authority of Canada administers the harbor.

Calling-in point.–Vessels approaching Port Weller from Lake Ontario shall contact "Seaway Welland" on VHF-FM channel 14 (156.70 MHz) upon arrival at the lighted buoy 2.4 miles N of Port Weller entrance channel and inform the traffic controller of their destination. After initial contact, vessels transiting the Welland Canal shall guard VHF-FM channel 14 (156.70 MHz). (See the Seaway Handbook for details.)

Port Weller Outer Light (43°14.7'N., 79°13.1'W.), 49 feet above the water, is shown from a red skeleton tower on a white building on the outer end of the W breakwater. A fog signal, a radiobeacon, and a ship calibrating radiobeacon are at the light. (See Canadian Radio Aids to Marine Navigation for details.)

Channels.–The harbor is entered from Lake Ontario between parallel breakwaters that converge at the outer end to a 400-foot opening. Lights mark the ends of the breakwaters. The channel between the breakwaters has been dredged to 27 feet and is marked by buoys and a 180° lighted range.

Anchorages.–A prohibited anchorage is in the approach to Port Weller Harbour and the Welland Canal. A triangular anchorage for vessels awaiting permission to transit the Welland Canal is about 1.5 miles W of Port Weller Harbour entrance and NW of Port Dalhousie. The anchorage has a gravel, clay, and mud bottom, and reported poor holding ground.

Wharves.–Port Weller Wharf 1: E side of harbor at inner end of breakwaters; 638 feet long; 27 feet alongside; receipt and shipment of general cargo.

Port Weller Wharf 2: W side of harbor at inner end of breakwaters; 1,288 feet long; 27 feet alongside; coal, sand, zircon ore, and bulk sugar are handled.

Small-craft facilities.–A marina protected by breakwaters is on the E side of the E breakwater near the inner end. The marina provides gasoline, diesel fuel, water, ice, sewage pump-out, marine supplies, a hoist to 16½ tons, and hull and engine repairs. In 1980, depths of 5 feet were reported alongside.

Welland Canal crosses the Niagara peninsula in a general N-S direction between Port Weller on Lake Ontario and Port Colborne on Lake Erie. The canal is under the jurisdiction of the St. Lawrence Seaway Authority of Canada. (See St. Lawrence Seaway, chapter 1.)

The canal is 27 miles long, and over this length, eight locks raise vessels a total of 327 feet from Lake Ontario to Lake Erie. The controlling depth in the canal is 27 feet with a maximum permissible draft of 26 feet.

Of the eight locks, the first seven are in the first 9 miles of the canal, from Thorold N. Locks 1 through 7 have usable lengths of 730 feet and widths of 80 feet. Each of these locks has 30 feet over the sills. The locks, with lifts of 43 to 48 feet, serve to raise vessels from Lake Ontario to the level of Lake Erie. Locks 4, 5, and 6 are twin locks that overcome the steep rise at Thorold known as Niagara Escarpment. Lock 8 is a guard lock near the S end of the canal at Port Colborne. Due to the large expanse of shoal water in Lake Erie, changes in wind direction and force create water level changes as great as 11 feet at Port Colborne. Lock 8 serves to pass vessels from the canal to the prevailing water level of Lake Erie. Lock 8 has a usable length of 1,148 feet and a width of 80 feet with 30 feet over the sill. Vessels not over 730 feet long and 76 feet in extreme breadth are allowed transit through the canal during the navigation season.

The canal is crossed by 12 bridges, 4 railway and 8 highway, and numerous overhead cables. The vertical lift bridges limit the overhead clearance through the canal to 120 feet. Two highway tunnels and a railway tunnel pass under the canal. The maximum permissible mast height for vessels transiting the canal is 116½ feet. Vessels with masts higher than

110 feet must furnish the Officer-in-Charge with authentic information before entering the canal.

Mileages in the Welland Canal are in statute miles zeroed at the outer end of the Port Weller Harbour breakwaters.

The city of **St. Catharines, Ont.,** fronts both sides of the canal and extends S from the Port Weller Harbour entrance for about 8 miles. St. Catharines is a **Canadian customs port of entry.**

On the E side of the canal at **Mile 2.1,** Port Weller Dry Docks Co. Ltd. operates a graving dock that handles vessels up to 730 feet long and 76 feet wide. It is the largest drydock on Lake Ontario. The channel leading to the drydock, dredged to 25 feet, is marked by dolphins.

The outflow from the pondage areas adjacent to Lock 2, **Mile 3.7,** and Lock 3, **Mile 6.3,** causes eddies and crosscurrents in the approach to these locks; caution is advised.

St. Catharines Wharf, on the W side of the canal at **Mile 5.2,** is 330 feet long with 25 feet reported alongside. Oil and general cargo are handled.

The Welland Canal Marine Post Office is at Lock 5 on the E side of the canal, **Mile 7.9.**

The town of **Thorold, Ont.,** is on the W side of the canal at **Mile 8.5. Thorold South, Ont.,** is on the E side of the canal, **Mile 10.**

Wharves.–There are several facilities at Thorold and Thorold South. Depths alongside are reported depths.

Facilities in the canal extending E at Mile 9.4:

Industrial Dock, Wharf 5: N side of canal; 500 feet long; 18 feet alongside; receipt of coal.

Industrial Dock, Wharf 6: N side of canal; 400 feet long, 1,125 feet of berthing space; 27 feet alongside; receipt of coal.

Ontario Paper Pulpwood Dock, Wharf 7: S side of canal; 740 feet long; 27 feet alongside; storage area for 90,000 cords of pulpwood; pulpwood and chemicals are handled.

Facilities on the E side of the Welland Canal:

Ontario Paper Dock, Wharf 8: Mile 9.8; 434 feet long; 24 feet alongside; storage area for 4,000 tons of newsprint.

Beaver Dock, Wharf 9: Mile 10.2; 1,000 feet long; 27 feet alongside; general cargo and fuel oil.

At **Mile 11.6,** mariners should exercise caution because of possible crosscurrents at the junction with the former Welland Canal channel.

At **Mile 15.3,** the **Welland River** crosses the canal flowing E toward the Niagara River. As the level of the river is 6 feet below the level of the canal, the river flows through a culvert underneath the canal.

Welland, Ont., is on the W side of the canal at **Mile 19.** Welland is a **Canadian customs port of entry.**

Welland Dock, Wharf 10, is on the NW side of a basin that opens on the canal at **Mile 19.4.** The dock is 730 feet long with 27 feet reported alongside.

Rameys Bend Dock, Wharf 12, on the E side of the canal at **Mile 23.7,** is 1,800 feet long with 27 feet reported alongside. Stone and sand are handled. A drydock here is 270 feet long, 60 feet wide, and has a depth of 9½ feet over the sill.

At **Mile 23.8,** two wharves are on the W side of the canal in a basin which was part of the former route of the Welland Canal. Robin Hood Mills Dock, Wharf 13, on the N side of the basin, is 1,000 feet long with 25 feet reported alongside; grain and grain products are handled. R.E. Law Dock, Wharf 14, on the S side of the basin, is 700 feet long with 25 feet reported alongside; stone is handled, and a storage area for 15,000 tons of stone is available. In the area of this basin is a moderate current from the former route of the canal; caution is advised.

Port Colborne, the Lake Erie entrance to the Welland Canal, and its facilities are described in chapter 6, Lake Erie.

Mariners navigating the Welland Canal are required to possess and be familiar with the contents of the following: (a) Seaway Handbook, (b) Canadian Hydrographic Chart *2042, Welland Canal, and (c) Notices to Shipping.

The Seaway Handbook can be obtained from Saint Lawrence Seaway Development Corporation, Massena, St. Lawrence Seaway Authority, Ottawa, and/or Canadian Publishing Centre, Supply and Services Canada, Hull, Quebec; the navigation chart from the Canadian Hydrographic Service, Department of Fisheries and the Environment, Ottawa; and the Notice to Shipping from the lockmaster at Lock 1 or Lock 8. (See appendix for addresses.)

Every vessel must be pre-cleared by its representative with the Authority before transiting the Seaway. Preclearance shall be arranged through the St. Lawrence Seaway Authority, Cornwall, Ont. (See appendix for address.) Pleasure craft of less than 350 tons do not require preclearance. No pleasure craft of less than 20 feet in overall length, or 1 ton in weight, is permitted to transit the canal. The publication "A Guide for Pleasure Craft" is recommended for pleasure craft using the locks of the Welland Canal and may be purchased from the Canadian Government Publishing Centre, Hull, Quebec. (See appendix for address.)

Welland Canal Regulations.–A-Vessels provided with radio transmissions: The Traffic Superintendent at Seaway Welland is in control of navigation throughout the Welland Canal, and dispatching of vessels will be subject to his instructions supplemented by instructions transmitted by lockmasters.

Whenever an approaching vessel arrives at CIP (Calling-In-Point) 15 or CIP 16, it must call Seaway Welland on VHF-FM channel 14 (156.7 MHz). It shall inform the traffic controller thereof of its destination. The traffic controller will then obtain the particulars required before transit is permitted and will give the necessary dispatch information to the vessel. The Traffic Controller is kept fully informed, by landline communication and closed circuit television of the position of all vessels as they pass bridges or leave the locks. Any vessel tied up at a wharf within canal boundaries must get clearance from the traffic controller before casting off.

Masters of vessels equipped with radiotelephone are to maintain the radiotelephone system available for receiving calls from Seaway Welland for the whole period from where the vessel comes within a range of 3 miles of the entrance of the canal until the vessel clears the canal.

The following channels have been assigned to this station for controlling movement of vessels in the Welland Canal and its approaches:

Seaway Welland (FM) (50 watts), Welland Canal radiotelephone located at the Vessel Traffic Control Centre at the Western Region Headquarters in St. Catharines near Lock 4, is licensed for controlling movement of vessels in the Welland Canal and its approaches on the following channels:

VHF-FM channel 14 (156.70 MHz)-For communication with ships.

VHF-FM channel 16 (156.80 MHz)-For calling and distress purposes only.

This station is continuously attended during the navigation season.

C-Fog conditions: Information regarding fog conditions between Thorold and Port Colborne may be obtained by calling Seaway Welland on the radiotelephone.

F-Velocity of current in canal: Due to the flow of water for power purposes, there is an average velocity of about 1 mile per hour between Lock 8 and the Hydro-Electric Power Commission intake north of Bridge 11. A crosscurrent towards the west exists 500 feet south of Bridge 11 and also at the entrance to the former Third Welland Canal channel north of Bridge 11. Masters of vessels are accordingly warned to guard against being drawn over to the west at these locations.

G-Handling vessel lines in locking: When locking, vessels shall be moored at the west wall of Locks 1 and 8, at the east walls of Locks 2, 3, and 7, and at the center wall of Locks 4, 5, and 6.

H-Speed of vessels: The maximum speed of vessels in the Welland Canal is as follows:

For all vessels, 6 knots over the bottom, except in the Welland By-Pass Channel from Port Robinson to Rameys Bend, maximum speed 8 knots over the bottom.

I-Passing moored vessels: The attention of masters of all vessels in the Welland Canal is called to Regulation 28 (3) of the Seaway Handbook, respecting the passing at slow speed any vessels moored to a wharf, pier, bank, etc. Regulation 28 (3) also applies to the harbors of Port Colborne, Port Weller, and Port Dalhousie. The observance of this Rule is vitally important when passing an oil tanker discharging or taking on cargo.

Charts *2063, *2070, 14810.–Port Dalhousie, Ont., a community of the city of St. Catharines, is about 3 miles SW of Port Weller Harbour. The community was once prominent as the Lake Ontario terminal port of the old Welland Canals.

The harbor at Port Dalhousie is entered from Lake Ontario through a channel that leads between parallel piers to an inner harbor basin. Lights, which form a 176°55′ range, are on both the outer and inner ends of the E pier. A private fog signal is at the front light. A daybeacon marks the outer end of the W pier. In 1974, it was reported that during storms the W pier covers; caution is advised. In 1971, the controlling depth in the entrance channel was 18 feet at midchannel with depths of 10 feet along the W pier and 12 feet along the E pier. The basin has depths of 10 to 15 feet except for a 6-foot shoal in the center.

Sluice gates are at the S end of the inner basin. Mariners are advised to guard against swift water when the gates open.

Marinas in the basin provide berths, gasoline, electricity, water, sewage pump-out, and a 13½-ton hoist for hull and engine repairs.

Charts *2063, 14810.–Jordan Harbour, about 5.7 miles WSW of Port Dalhousie, is a shallow bay separated from Lake Ontario by a narrow sandbar. A narrow entrance channel through the bar is protected on the E by a small breakwater. A shifting sandbar at the entrance at times has less than 2 feet of water over it. The entrance channel has depths of 2 feet, and freshets are reported to deepen it to 6 feet at times. The bay has depths of about 3 feet. A highway bridge over the entrance channel has a clearance of 7½ feet. A marina in the bay provides gasoline, water, a launching ramp, and engine repairs.

Grimsby, Ont., is at the mouth of **Forty Mile Creek,** 14.5 miles W of Port Dalhousie. A small-craft basin, protected by breakwaters, is just E of the mouth of the creek. In 1977, a depth of 3 feet was reported in the entrance with 2 feet in the basin. The outer end of the E breakwater is marked by a light. A marina provides berths, gasoline, electricity, water, sewage pump-out, and a 15-ton mobile hoist; hull and engine repairs are available.

A **danger area** of the Grimsby Small Arms Range, extending about 1.3 miles offshore, is 20 miles W of Port Weller at **Fifty Mile Point** (43°13.7′N., 79°37.7′W.). The intermittent use of the area is announced by local Canadian Coast Guard Marine Radio Broadcasts and may also be advertised in local newspapers. (For details, consult the Annual Edition of Canadian Notices to Mariners.)

Fifty Mile Point is marked by a light.

Charts *2063, *2067, 14810.–Hamilton Harbour, formerly known as Burlington Bay, is a natural landlocked bay about 4.5 miles long and 3 miles wide at the extreme W end of Lake Ontario. The bay is separated from the lake by a narrow neck of sand through which **Burlington Canal** has been cut to provide access to the bay. The bridges crossing the canal and a blue sphere at the sewage treatment plant 3.5 miles SE of the canal are prominent from lakeward. The city of **Hamilton, Ont.,** is on the S side of Hamilton Harbour.

The Hamilton **harbormaster's** office operates a 24-hour communications center daily during the navigation season for emergency, safety, and operational requirements. Ships entering Hamilton Harbour may contact the harbormaster's office for information by radiotelephone on VHF-FM channel 16 (156.80

MHz), safety and calling, and 2003 kHz or VHF-FM channels 12 (156.60 MHz) or 14 (156.70 MHz), working; call sign, XJF-496.

Channels.–Hamilton Harbour is entered from Lake Ontario through Burlington Canal. The canal, about 1 mile long, is protected by two parallel piers where it cuts through the neck that separates the lake and bay. Lighted buoys mark the approaches to the canal, and lights mark the piers. A 233°27′ lighted range marks the lake approach, and a fog signal is on the S pier. A radiobeacon and a ship calibrating radiobeacon are on the outer end of the S pier. (See Canadian Radio Aids to Marine Navigation for details.) The channel through the canal is maintained at a depth of 29 feet.

Randle Reef, with a least depth of 6 feet, is in the S part of Hamilton Harbour just off the cargo wharves. The reef is about 0.4 mile long and marked by buoys.

Anchorages.–A designated anchorage is on the N side of Hamilton Harbour. Anchorage is prohibited in the W part of the harbor where submerged pipelines cross between the N and S shores.

Bridges.–Burlington Canal is crossed by two bridges. The E bridge, Burlington Canal Bridge, a combined highway and railroad vertical lift, has a clearance of 10 feet down and 120 feet up. Signal lights on the bridge control vessel traffic, allowing passage under the bridge in only one direction at a time. The W bridge, the Burlington Skyway, a fixed highway, has a clearance of 120 feet.

Burlington Canal Bridge Radiotelephone Station, call sign, XL146, is operated by the Department of Public Works for communication with vessels passing through the Burlington Canal Bridge. Contact the station on VHF-FM channel 16 (156.80 MHz). Vessels approaching and desiring to pass through the bridge from Lake Ontario shall obtain a clearance by radiotelephone at not less than 4.5 miles from the bridge. Vessels on the harbor side of the bridge shall obtain a clearance by radiotelephone before leaving their dock. In both cases, vessels could be governed by the bridge traffic lights as soon as they approach within visual distance.

Towage.–Tugs are available in the harbor for docking or moving vessels.

Hamilton is a **Canadian customs port of entry.**

Harbor Regulations.–Copies of the Hamilton Harbour regulations may be obtained from the Port Director, Hamilton Harbour Commissioners, Hamilton, Ont.

Regulations Respecting Navigation in the Burlington Canal:

1. These Regulations may be cited as the Burlington Canal Regulations.

2. In these Regulations,

(a) "bridge" means the lift bridge over the canal; and

(b) "canal" means the Burlington Canal between Lake Ontario and Hamilton Harbour.

3. No vessel shall move in the canal at a speed greater than,

(a) If the vessel is not over two hundred and sixty feet in length, eight miles per hour; or

(b) If the vessel is over two hundred and sixty feet in length, the lowest speed at which the vessel can be navigated safely.

4.(1) No vessel shall, while moving within one half mile of the canal towards the canal, pass another vessel going in the same direction.

(2) Subsection (1) does not apply in respect to vessels less than fifty feet in length.

5. Where a vessel requires the bridge to be opened, a request shall be made to the bridgemaster by radiotelephone or, if such communication is not possible, the vessel shall sound three long blasts on the whistle or horn.

6.(1) No vessel fifty feet or more in length shall enter the canal, except in an emergency, until the signal light on the bridge shows green in the direction of the vessel.

(2) Where a vessel fifty feet or more in length enters the canal while the signal light does not show green in its direction, it shall moor at the N wall of the canal and shall not proceed until the signal light shows green in its direction.

7.(1) No vessel less than fifty feet in length shall move nearer than three hundred feet from the bridge unless the bridge is opened or until a flashing blue light is shown in its direction.

(2) Where a vessel less than fifty feet in length enters the canal while the bridge is not opened and while the flashing blue light is not shown in its direction, it shall wait at the side of the canal to its starboard.

8. No vessel shall be operated under sail in the canal.

9. Every person who violates any provision of these Regulations, or who is in charge of a vessel that is operated in contravention of these Regulations, is guilty of an offense and is liable on summary conviction to a fine not exceeding five hundred dollars.

Wharves.–Hamilton has numerous deep-draft facilities. All the terminals have highway connections and most have railway connections. General, container, and a variety of bulk cargoes are handled. A 75-ton floating crane is available. The alongside depths for the facilities described are reported depths.

Facilities owned and/or operated by the Hamilton Harbour Commissioners:

Centennial Dock, Pier 8: (43°16′38″N., 75°51′31″W.); 600-foot face W side, 1,600-foot face N side, 500-foot face E side; 27 feet alongside; 20 acres open storage; 188,000 square feet covered storage; general cargo.

Wellington Street Terminal Pier 10: (43°16′32″N., 79°51′00″W.); 1,304-foot face N side, 1,700-foot face E side; 27 feet alongside N side, 23 to 27 feet alongside E side; 18 acres open storage; 200,000 square feet covered storage; general cargo.

Pier 11: (43°16′29″N., 79°50′50″W.); 1,000-foot face N side, 22 feet alongside; 1,700-foot face W side, 27 feet alongside; 1,300-foot face E side, 21 to 23 feet alongside; storage tanks; 11 acres open storage; petroleum products and bulk storage.

Pier 12: (43°16′27″N., 79°50′34″W.); 820-foot face N side, 1,230-foot faces W and E sides; 27 feet alongside; 24 acres open storage; bulk coal and chemicals. Note: The use of bow thrusters is prohibited along the N and W faces.

Pier 14: (43°16′23″N., 79°50′21″W.); 800-foot face N side, 1,200-foot face W side, 400-foot face E side; 27 feet alongside; 12 acres open storage; bulk chemicals and dry cargo.

Pier 23: (43°16′00″N., 79°47′17″W.); 2,400-foot face; 23 feet alongside; 4 acres open storage; bulk cargo, scrap, oil berth.

Pier 24: (43°16′03″N., 79°47′12″W.); 1,200-foot face; 27 feet alongside; 10 acres open storage; 112,000 square feet covered storage; general cargo.

Private facilities:

International Harvester Pier 15: (43°16′18″N., 79°50′09″W.); 700-foot face; 17 feet alongside; 540,000 square feet open storage; machinery.

Steel Company of Canada Ore Dock No. 2, Pier 16: (43°16′38″N., 79°49′47″W.); 4,000-foot face; 25 to 27 feet alongside; traveling bridge unloaders, 750-ton-per-hour capacity; ore and coal.

Steel Company of Canada Ore Dock No. 3, Pier 17: (43°16′58″N., 79°49′11″W.); 1,400-foot face; 18 to 24 feet alongside; ore and coal.

Dominion Foundries and Steel Pier 21: (43°16′22″N., 79°47′57″W.); 4,000-foot face; 26 feet alongside; mobile cranes; ore and coal storage.

Canadian Centre for Inland Waters Wharf: E side of the harbor immediately N of Burlington Canal; 1,100 feet long; 21 to 27 feet alongside; mooring of survey and research vessels; small-craft moorings at N end of wharf. The Centre performs many functions including major studies dealing with the waters of the Great Lakes. A detached breakwater, marked at each end by a light, parallels and protects the wharf.

Supplies.–Diesel fuel, diesel oil, and bunker fuel are readily available. Water, provisions, and deck, cabin and engine stores are available.

Repairs.–Hamilton has no drydocks, but several local firms do machinery repairs and above-the-water hull work.

Small-craft facilities.–A dockyard operated by the harbor commissioners is in the SW part of the harbor. Gasoline, diesel fuel, water, sewage pump-out, a 50-ton mobile hoist, and hull and engine repairs are available. A marina, protected by floating breakwaters and marked by private lights, is at La Salle Park on the N side of the harbor.

Communications.–Hamilton is connected by rail and trucklines with other major cities. Toronto International Airport is 30 miles NNE.

Charts *2063, *2070, 14810.–From Hamilton Harbour, the shoreline extends generally NE for 30 miles to Toronto Harbour. Along this stretch are harbors at Bronte, Oakville, Clarkson, and Port Credit. Deep water is from 0.5 to 1 mile offshore.

A Shell Oil Co. of Canada, Ltd. oil terminal is 1.3 miles SSW of Bronte. A 2,250-foot pier, marked at its outer end by a light, extends SE from shore. A berth at the outer end of the pier can handle vessels to 400 feet long. Depths of 25 feet are reported alongside the berth.

Bronte Harbour, about 7.5 miles NE of Hamilton Harbour, is a small-craft harbor inside the mouth of **Bronte Creek at Bronte, Ont.,** part of the town of Oakville. The harbor is formed by two breakwaters at the mouth of the creek. The outer end of the N breakwater is marked by a light with a private fog signal. The entrance channel follows close along the N breakwater. In 1977, the controlling depth was 7 feet.

A marina and boatyard on the W side of the inner harbor provides berths, gasoline, diesel fuel, water, electricity, ice, marine supplies, sewage pump-out, and a 15-ton mobile hoist for hull repairs.

Oakville, Ont., about 3.5 miles NE of Bronte, is at the mouth of **Oakville Creek.** Two church steeples in the town are prominent.

The harbor is entered through a channel between two piers. A dredged basin enclosed by breakwaters is on the S side just inside the mouth of the creek. The E pier is marked at the outer end by a light with a private fog signal, and a buoy marks the approach to the harbor. In 1980, the midchannel controlling depth was 7 feet through the harbor entrance to the second highway bridge. In 1980, the dredged basin had depths of 2 to 6 feet. Two fixed highway bridges with a minimum clearance of 32 feet cross the creek.

Oakville is a **Canadian customs port of entry.**

A yacht club on the SW side of the creek provides transient berths, gasoline, diesel fuel, electricity, ice, water, and sewage pump-out.

The St. Lawrence Cement Co. Wharf is about 4.2 miles NE of Oakville, just SW of Clarkson. A causeway extends 1,200 feet SE from shore to a 1,100-foot berth with depths of 19 to 28 feet alongside the outer faces of the wharf. The wharf has two prominent silos with a combined capacity of 1,000 tons of cement. Powdered coal and limestone are discharged at the wharf.

Clarkson Harbour, Ont., is the site of the Gulf Oil Co., Ltd. dock, on the shore of the lake about 5 miles NE of Oakville. Two lighted 395-foot stacks at the refinery are prominent.

A 1,100-foot pier extends SE into the lake to a 740-foot dock, which extends SSE from the pier. A private **338°04′** lighted range on the dock marks the approach; a private fog signal at the front light is sounded when a vessel is expected. Private buoys mark shoals NW and SW of the dock. In 1972, the dock had depths of 23 feet along the NE side and 22 to 24 feet along the SW side.

Port Credit, Ont., is a community on both sides of the **Credit River,** about 8.5 miles NE of Oakville. Two water tanks and a 334-foot-high stack at the NE side of the community are prominent. Also prominent are oil tanks, a 310-foot-high stack, and a tower topped by an open flame close SW of Credit River entrance.

The harbor at Port Credit, on the N side of the river entrance, is formed and protected on the N and S sides by stone breakwaters and on the E side by a sunken ship breakwater. The harbor is entered from the SW through a 60-foot-wide opening between the outer end of the S breakwater and the sunken ship breakwater. Lights mark the outer end of the N breakwater, the inner and outer ends of the S breakwater, and the S end of the E breakwater. The approach to the harbor has depths of about 13 feet. In 1977, the controlling depth in the harbor entrance was 7 feet with deeper water inside.

A channel through the mouth of Credit River is marked by buoys. In 1975, the controlling depth was 7 feet; however, the channel is subject to extensive shoaling. A **speed limit** of 3 knots is enforced on the Credit River.

Marinas and boatyards are inside the river and in the harbor. Berths, electricity, gasoline, diesel fuel, ice, water, marine supplies, sewage pump-out, a 30-ton travel lift, a 25-ton marine railway, cranes to 8 tons, and hull and engine repairs are available.

About 0.3 mile S of the mouth of Credit River, Texaco Canada has a dredged slip with depths of about 10 feet. From the N side of the slip, a submerged pipeline extends 0.4 mile SE to three offshore cribs that provide 500 feet of berthing space. The berth, marked at each end by a private light, has depths of about 21 feet alongside.

The Lakeview Generating Station is about 2 miles NE of Port Credit. A pier, protected by a breakwater on the NE side, extends 1,800 feet into the lake. A 1,000-foot coal berth at the outer end has depths of 27 feet alongside. In 1960, the approach to the berth had a controlling depth of 26 feet. The approach is marked by private lighted buoys and lights on the pier.

Charts *2063, *2085, 14810.–Humber Bay is an open bight about 3 miles wide just W of Toronto Harbour. The **Humber River** discharges into the NW side of the bay about 3.5 miles W of the W entrance to Toronto Harbour. The river is navigable by small craft for about 1.5 miles above the mouth. At the entrance, the E side should be favored because of shoaling to 1 foot in the W half of the entrance. Three highway bridges, a railroad bridge, and overhead power cables cross the river just above the mouth. The minimum clearance under the bridges and cables is 9½ feet.

Just SW of the mouth of the Humber River, an area for a proposed small-craft harbor is being filled; caution is advised.

From the mouth of the Humber River, a seawall parallels the shore of the bay about 200 to 300 feet off and extends E to the W entrance to Toronto Harbour. There are numerous entrances through the seawall, some lighted, and small craft can find good shelter between the seawall and the shore.

Ontario Place, a recreational park, is in the NE part of Humber Bay on the NW side of the W entrance channel to Toronto Harbour. A marina, on the S side of Ontario Place, is protected by a breakwater marked by private lights. Berths, electricity, water, ice, and sewage pump-out are available.

Two small-craft mooring basins, protected by breakwaters, are in the NE corner of Humber Bay, NW of Toronto Island. The entrances to the basins are marked by lights. The basins have depths of 4 to 9 feet.

Charts *2085, 14810.–Toronto Harbour, on the NW side of Lake Ontario about 35 miles from the W end of the lake, serves Ontario's capital city, **Toronto.** The harbor is the most important shipping center on Lake Ontario.

The inner harbor, about 2.5 square miles, is formed by a low-lying island about 4 miles long. **Toronto Island, Centre Island,** and **Wards Island** form the N, central, and E parts of the low-lying island.

On the S side of the inner harbor are many small islands with marinas and recreational areas.

On **Gilbraltar Point,** the SW part of Toronto Island, is a radiobeacon. A lighted buoy marks the extent of the shoal water S of the point. Five lighted red and white radio masts about 100 feet high extend in a line SSE from Gilbraltar Point for 0.3 mile.

The harbor is also protected by **Outer Harbour East Headland,** a spit of land that extends SSW about 3 miles from Coatsworth Cut (43°39.5'N., 79°18.8'W.) and serves as a breakwater. An aquatic park is under construction on the N side of the spit. A lighted buoy marks the outer limit of fill operations on the SE side of the headland.

Toronto Outer Harbour is an area under development on the N side of, and protected by, Outer Harbour East Headland.

The Toronto Harbour Commissioners operate a Harbour Communications Centre for emergency, safety, and operational requirements. Vessels entering the harbor should contact the Toronto harbormaster on VHF-FM channel 16 (156.80 MHz), safety and calling, and VHF-FM channels 12 (156.60 MHz) or 14 (156.70 MHz), working; call sign, XJF–495.

Prominent features.–Toronto has numerous prominent structures; the most conspicuous is the 1,808-foot CN Tower, the world's tallest freestanding structure. The tower is close to the waterfront in about 43°38.5'N., 79°23.2'W. Also prominent in the city are the Provincial Parliament buildings about 1.5 miles N of the waterfront, the Royal York Hotel, the Canadian Imperial Bank of Commerce, the Toronto Dominion Centre buildings, and the steeples of St. James and St. Michael's Cathedrals. The Bulova Tower, about 0.6 mile NW of Toronto Island, is prominent in the W approach to the harbor.

Toronto Harbour Aquatic Park Light (43°36.8'N., 79°20.6'W.), 52 feet above the water, is shown from a white hexagonal tower with the upper part red on the S end of Outer Harbour East Headland. A fog signal and a radar transponder beacon (RACON) are at the light. (See Racons, chapter 1, for additional information.)

Channels.–Toronto Harbour is entered through two dredged channels, one at either end of the harbor. **Main Harbour Channel**, the E entrance, extends N from the lake on the W side of Outer Harbour East Headland. It is marked by lighted buoys and a 002°30′ lighted range. SE of Wards Island, the channel divides, with the E branch leading NE through Outer Harbour to a basin at its upper end and the W branch turning NW into the inner harbor. The channels are marked by lighted and unlighted buoys. Main Harbour Channel and Outer Harbour have been dredged to 29 feet. **Western Gap**, the W entrance, extends NE from the lake on the N side of Toronto Island to the inner harbor. A 055°19′ lighted range marks the approach to the channel, and lighted buoys mark the channel. The channel has been dredged to 27 feet. In April 1979, the reported controlling depth was 22 feet.

The dredged part of the inner harbor has a depth of 27 feet. In April 1979, a depth of 23 feet was reported in the W part of the inner harbor in about 43°38′08″N., 79°23′35″W., and a depth of 26 feet was reported in the S part in about 43°38′11″N., 79°21′50″W. Two canals have been dredged from the inner harbor into the industrial park on the E side of harbor. The southernmost, **Ship Channel**, extends NE for about 1.3 miles to a turning basin. In March 1981, the channel had a controlling depth of 20 feet. Depths of 24 feet were reported in the basin in April 1979. From the basin, **Leslie Street Slip** extends another 0.2 mile NE and has a depth of 24 feet. **Keating Channel** extends 0.6 mile NE from the NE corner of the inner harbor. The channel, an artificial outlet of the **Don River**, is subject to shoaling after freshets and has reported depths of 5 to 13 feet. Mariners should obtain the latest depth information from the Toronto harbormaster before entering Keating Channel.

Anchorages.–Three designated anchorages controlled by the harbormaster are on the S side of the inner harbor. The anchorages have depths of 19 to 31 feet.

Bridges.–A bascule bridge with a clearance of 10 feet crosses Ship Channel 0.3 mile above the entrance, and overhead power cables with a clearance of 130 feet cross the channel 1.1 miles above the entrance. One hour advance notice to the Harbour Communications Center is required for bridge openings. The opening signal for the bridge is one long, one short, and one long blast. A bascule bridge with a clearance of 10 feet crosses Keating Channel near the entrance. The opening signal for the bridge is two long and two short blasts. From both bridges, the opening signal is returned before opening. Two blasts are sounded before closing, and three blasts are sounded to indicate the bridge is not ready to open.

Ferries.–A passenger and vehicle ferry operates across Western Gap near the inner end. There is regular ferry service from a terminal on the N side of the inner harbor to Toronto Island, Centre Island, and Wards Island.

Towage.–Tugs are available in the harbor, but under ordinary conditions they are not necessary for handling ships.

Toronto is a **Canadian customs port of entry.**

Toronto Coast Guard Station is on the E side of Main Harbour Channel, NE of Wards Island.

Harbor regulations.–A speed limit of 6 mph (5.2 knots) is enforced in the harbor entrances. The harbormaster controls harbor movements of all vessels, except small craft. Vessels should check with the Toronto Harbour Communications Centre before entering or leaving the harbor. Copies of the Toronto Harbour regulations may be obtained from Secretary, Toronto Harbour Commissioners, Toronto, Ont.

Wharves.–Toronto has a large number of deep-draft facilities, and all types of cargo are handled. The wharves have highway and rail connections. A 300-ton fixed crane and a 35-ton mobile container crane are available. The alongside depths are reported depths. For latest information on depths alongside, contact the operator.

Facilities on the N side of the inner harbor:

Canada Malting, Berth 211: 400-foot face; 20 feet alongside; 354,000 square feet covered storage; 1¼-million-bushel grain elevators; malt and grain.

Maple Leaf Mills, Berth 223: 500-foot face; 25 feet alongside; animal and vegetable oils.

Maple Leaf Mills, Berth 231: 500-foot face; 25 feet alongside; 4-million-bushel grain elevators; grain and soya beans.

Maple Leaf Mills, Berth 232: 445-foot face; 26 feet alongside; 48,000 square feet covered storage; grain and soya beans.

Toronto Harbour Commission Marine Terminal, Berths 272, 273: 755-foot face; 27 feet alongside; 97,000 square feet covered storage, 100,000 square feet open storage; general cargo.

Redpath Sugars Ltd., Berths 274, 275, 281: 800-foot face S side, 27 feet alongside; 500-foot face E side, 25 to 27 feet alongside; 500-foot face W side, 27 feet alongside; sugar silos and open and covered storage; gantry cranes; sugar.

Queen Elizabeth Docks, Berths 282, 283, 291-293: 2,145-foot face S side, 27 feet alongside; 450-foot face E side, 24 feet alongside; 2½ acres open storage; general cargo.

Gooderham and Worts Ltd., Berth 294: 300-foot face; 22 to 24 feet alongside; tank storage; molasses and glycol.

Victory Soya Mills Ltd., Berths 311, 312: 990-foot face; 22 feet alongside; over 1¾-million-bushel grain elevators; 322,000-gallon capacity tanks; grain.

Facilities in Keating Channel:

Canada Malting, Berth 312: 300-foot face; 18 feet alongside; 2⅓-million-bushel grain elevators; 34,000 square feet covered storage; malt and grain.

Canada Iron Foundries Ltd., Berths 313, 314: 900-foot face; 14 feet alongside; 16,000 square feet covered storage, 393,000 square feet open storage; scrap and finished metals.

Lake Ontario Cement, Berths 341, 342: 400-foot face; storage silos; cement and stone.

Facilities on the E side of the inner harbor:

E. L. Cousins Docks, Toronto Harbour Commission Terminal, Berths 351–358: 1,200-foot face N side, 26 feet alongside; 750-foot face W side, 26 feet alongside; 1,200-foot face S side, 25 to 26 feet alongside; 138,000 square feet covered storage, 20 acres open storage; 300-ton crane; petroleum products, molasses, and general and containerized cargo.

Canada Cement Lafarge Ltd., Berth 361: 500-foot face; 25 feet alongside; 19,000 square feet covered storage; cement.

Toronto Harbour Commission, Berths 362–364: 1,100 feet berthing space; 27 feet alongside; not in use.

Industrial Metals Ltd., Berths 365–368: 400-foot face W side, 1,500-foot face S side; 27 feet alongside; 28,000 square feet covered storage, 552,000 square feet open storage; storage for 100,000 tons of scrap metal; mobile cranes; scrap metal.

Toronto Harbour Commission Marine Terminal, Berths 512–514: 1,500-foot face N side, 500-foot face W side; 26 feet alongside; 200,000 square feet covered storage, 40 acres open storage, 164,000 cubic feet cold storage; 35-ton mobile container crane; general and containerized cargo.

Berth 522: 500-foot face; 26 feet alongside; 40 acres open storage; 25-ton crane; roll-on/roll-off berth; paper, containerized and roll-on/roll-off cargo.

Facilities on N side of Ship Channel:

Texaco Canada Ltd., Berths 412–414: 1,400-foot face; 26 feet alongside; storage tanks; gasoline, distillates, naphtha.

Darling & Co., Berth 415: 300-foot face; 26 feet alongside; storage tanks; tallow.

Toronto Harbour Commission, Berth 416: 600-foot face; 26 feet alongside; not in use.

Englebrook Investments Ltd., Berths 421, 422: 750-foot face; 26 feet alongside; storage tanks; petroleum products.

Canadian Fuel Marketers Group Ltd., Berth 423: 250-foot face; 26 feet alongside; storage tanks; fuel oil.

Sun Oil Co. Ltd., Berth 424: 400-foot face; 26 feet alongside; storage tanks; petroleum products.

Liquiterminals, Berth 425: 500-foot face; 26 feet alongside; vegetable and animal oils, non-hazardous chemicals.

Cliffside Pipelayers Ltd., Berth 426: 500-foot face; 26 feet alongside.

Shell Oil Ltd., Berth 433: 500-foot face; 22 to 25 feet alongside; storage tanks; gasoline, lubricating oil, and distillates.

Harbour Master's Public Dock, Berth 434: 600-foot face; 25 feet alongside; 61,000 square feet open storage.

Toronto Harbour Commission, Berths 435-438: 2,000 feet of berthing space; 24 to 25 feet alongside; 17 acres open storage; general cargo.

Intermetco Ltd., Berth 439: 500-foot face; 24 to 25 feet alongside; 12 acres open storage; scrap metal.

Toronto Harbour Commission, Berth 441: 1,100-foot face; 17 acres open storage; not in use.

Facilities on the S side of Ship Channel:

Hydro Electric Power Commission R. L. Hearn Generating Station, Berths 443–445, 451–453: 2,600-foot face; 25 feet alongside; 40 acres open storage; conveyor system; coal.

Natomas of Canada, Berth 454: 200-foot face; 26 feet alongside; storage tanks; gasoline and lubricating oils.

Texaco Canada Ltd., Berth 455: 700-foot face; 26 feet alongside; storage tanks; petroleum products.

Ultramar Petroleum Co. Ltd., Berth 456: 450-foot face; 26 feet alongside; storage tanks; petroleum.

Canadian Salt Co., Berths 461, 462: 650-foot face; 26 feet alongside; salt.

Iroquois Salt Products, Berth 463: 500-foot face; 25 feet alongside; salt.

Sifto Salt Division, Berth 464: 500-foot face; 25 feet alongside; not in use.

Toronto Harbour Commission, Berth 465: 200-foot face; 24 to 25 feet alongside; 12 acres open storage.

Supplies.–The port has marine supplies and provisions of all kinds. Water is available at most wharves, and fuel oil and diesel oil are available at the fueling docks.

Repairs.–Several firms in the port do welding, and installation and repair of electrical equipment.

Small-craft facilities.–The S part of the inner harbor has several marinas.

Communications.–Toronto is the rail center for the Province of Ontario, and has excellent highway connections. Toronto International Airport is NW of the city.

Coatsworth Cut, the entrance to **Ashbridge Bay**, NE of the entrance to Main Harbour Channel to Toronto Harbour. The cut is subject to silting. There are small-craft facilities on the E side of the bay, and the approach to these has been dredged to 5 feet.

Charts *2062, 14810.–From Toronto Harbour, the shore extends NE for about 17 miles to Frenchman Bay. Along this stretch, deep water is about 0.5 to 1 mile offshore. From about 3 miles to 12 miles NE of Toronto Harbour, the shore is a high sand and clay bank known as **Scarborough Bluffs.** The bluff reaches a height of 380 feet about 7 miles NE of Toronto Harbour. A prominent cupola at a former seminary is behind Scarborough Bluffs in about 43°42.9'N., 79°14.5'W. About 6 miles NE of Toronto Harbour, a small-craft basin is being constructed behind a landfill breakwater; the entrance is marked by a light and a daybeacon. Several stacks are prominent along this stretch.

Frenchman Bay, about 17 miles NE of Toronto Harbour, is a well-sheltered bay separated from Lake Ontario by **Fairport Beach**, a narrow sandbar. Parallel breakwaters protect the entrance channel to the bay. It is reported that the breakwaters partially cover during high water stages. The entrance channel, subject to silting, had depths of about 1 foot in 1974. The approach to the bay is marked by a lighted buoy, and a light showing a 358° to 001° white sector is on the E entrance point. Depths inside the bay range from 2 to 12 feet, but most of the bay has depths of 2 to 4 feet. Several marinas in the bay provide berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, sewage pump-out, and hoists to 50 tons for hull and engine repairs.

Pickering Generating Station, a nuclear plant, is on **Moore Point** (43°48.6′N., 79°03.4′W.), E of Frenchman Bay. The buildings at the plant are prominent. A lighted 225-foot dome is close S of the power station, and a lighted 315-foot microwave tower is close N of the power station. Two 900-foot-long stone groins, marked by lights, are S of the power station.

From Frenchman Bay, the shore trends ENE for 8.5 miles to Whitby Harbour, thence another 5.5 miles to Oshawa Harbour. Along this stretch, deep water is about 0.7 mile off.

Five lighted radio towers are prominent on **Richardson Point,** 4 miles E of Moore Point.

Charts *2062, *2070, 14810.–Whitby Harbour is about 26 miles NE of Toronto Harbour. The town of **Whitby, Ont.,** is about 1.5 miles N of the harbor. A prominent stack is at Ontario Hospital on the W side of the harbor.

The harbor is formed by a long breakwater closing the W part of the natural opening from the lake, and is entered through a channel between two piers extending into the lake at the E side. The approach to the harbor is marked by a **352°57′** lighted range on the E pier, and buoys mark the channel. The approach channel and basin are reported to be maintained at charted depths; caution is advised.

From the basin, a dredged channel leads to a marina basin at the N end of the harbor. In 1978, the controlling depth in the channel and basin was 6 feet except for shoaling along the edges. The marina provides berths with electricity, gasoline, diesel fuel, water, ice, sewage pump-out, and a hoist to 35 tons.

The N side of the harbor has a drydock and repair plant. The repair wharf is 300 feet long with 13 feet alongside, and the drydock is 265 feet long and 50 feet wide. A 25-ton stiffleg crane is available at the facility.

Charts *2062, *2058, *2070, 14810.–Oshawa Harbour, serving the city of **Oshawa, Ont.,** is about 31 miles NE of Toronto Harbour. A water tank and lighted stack at the General Motors plant 2.2 miles NW of the harbor are prominent.

Channels.–The harbor is entered from Lake Ontario through a channel between two breakwaters. The approach is marked by a **327°22′** lighted range on the W breakwater. A fog signal is at the front light and a radiobeacon is about 623 feet 314° from the light. Buoys mark the channel. The entrance channel and basin are reported to be maintained at charted depths. The entrance channel and basin are subject to shoaling, and local knowledge is advised for entering the harbor.

It is reported that during strong E winds there is a strong set in the entrance channel toward the W pier; caution is advised.

Oshawa is a **Canadian customs port of entry.**

Harbor regulations.–The harbor is under the administration of the Oshawa Harbour Commissioners. Copies of the harbor regulations may be obtained from the Secretary, Oshawa Harbour Commissioners, 36½ King Street, East, Oshawa, Ont.

Wharves.–The principal cargoes handled in the port are petroleum products, road safety salt, sugar, coke, gypsum, and coal. The basin has 500 feet of berthing space along the S wharf, 500 feet along the W wharf, and 500 feet along the E wharf. The E wharf has 22,500 square feet of covered storage. The E wharf has reported depths of 27 feet alongside, and the S and W wharves have reported depths of 17 feet alongside.

Supplies.–Water and diesel fuel are available.

Small-craft facilities.–A marina on the NW side of the harbor provides transient berths, gasoline, diesel fuel, electricity, marine supplies, sewage pump-out, a 40-ton hoist, and hull and engine repairs.

Charts *2058, *2070, 14810.–For about 2 miles E of Oshawa Harbour, the shore is a low gravel beach which then changes to a clay bank 25 to 80 feet high for the next 3 miles E to **Raby Head. McLaughlin Bay** is a shallow pond 1.4 miles E of Oshawa Harbour. In 1972, the entrance had reported depths of 1 foot. A lighted microwave tower and a lighted radio tower N of McLaughlin Bay, and five lighted radio towers 1.2 miles E of McLaughlin Bay, are prominent. At prominent Raby Head, the clay bank reaches a height of 105 feet, and from there NE for 2.8 miles to Port Darlington, the shore is generally a low sandy beach. From Oshawa Harbour to Port Darlington, deep water is generally less than 1 mile offshore.

A wharf at a cement company about 1.5 miles E of Raby Head extends lakeward about 0.4 mile. The S ends of the wharf are marked by lights. The wharf has 840 feet of berthing space with 29 feet reported alongside.

Port Darlington, about 8 miles E of Oshawa Harbour and 40 miles ENE of Toronto Harbour, serves the town of **Bowmanville, Ont.,** directly inland from the port. A lighted 288-foot stack at the cement plant W of the harbor is prominent. The harbor consists of a small bay and a channel at the mouth of a small creek. Parallel piers protect the entrance channel. A light marks the outer end of the W pier, and a buoy is off the end of the E pier. In 1977, the controlling depth was 4 feet in the entrance channel to the marina about 0.4 mile above the entrance. The marina provides berths, electricity, gasoline, diesel fuel, ice, sewage pump-out, a 20-ton hoist, a 20-ton marine railway, and hull and engine repairs.

From Port Darlington E for 4.4 miles to Newcastle, the shore is a clay bank 10 to 45 feet high.

Newcastle, Ont., about 9.5 miles E of Oshawa Harbour and 45 miles ENE of Toronto Harbour, has a small-craft harbor at the mouth of **Graham Creek.**

The town has two prominent church steeples. Two breakwaters protect the unmarked entrance channel. In 1977, the entrance channel had a reported centerline controlling depth of 5 feet. A marina inside the entrance provides gasoline, diesel fuel, water, electricity, sewage pump-out, and hull and engine repairs.

From Newcastle ENE for 14.6 miles to Port Hope, the shore continues as a clay bank 20 to 100 feet high, generally close to the shoreline. Deep water is from 0.5 to 0.8 mile off. A 383-foot lighted microwave tower and a 664-foot chimney marked by strobe lights, 8.8 and 9.4 miles ENE of Newcastle, are prominent.

Port Hope, Ont., is a small-craft harbor 27 miles ENE of Oshawa Harbour and 58 miles ENE of Toronto Harbour. A stack at the Eldorado Nuclear Refinery on the W side of the harbor, and a water tank and two church steeples in the town are prominent.

The harbor is entered from Lake Ontario through a channel between two piers to an outer basin enclosed on the E side by a breakwater. A center pier divides the outer basin into two arms. From the outer basin, the E harbor arm extends N to the mouth of **Ganaraska River.** The W arm extends NNW to an inner basin. A **320°21′** lighted range marks the approach to the harbor, and lights mark the outer ends of the piers.

In 1984, the controlling depth in the entrance channel was 6 feet; a depth of 7 feet could be carried from the outer harbor into the E arm for about 0.2 mile with shoaling to 1 foot above this point; the channel leading to the inner basin had a depth of 7 feet, with 3 to 7 feet available in the basin. The harbor is subject to silting.

Port Hope is a **Canadian customs port of entry.**

A marina in the E arm provides berths with electricity, gasoline, water, and sewage pump-out.

Peter Rock, about 3 miles E of Port Hope, is about 0.7 mile offshore and marked by a light. A rocky ledge, covered less than 6 feet, connects the rock with the shore. The passage between the light and the shore is not used. A lighted microwave tower 2.3 miles NW of the rock is prominent.

Cobourg, Ont., is 6.3 miles E of Port Hope and 65 miles ENE of Toronto Harbour. Oil tanks close W of the harbor are prominent from lakeward.

Channels.–Three piers form the harbor. The E and W piers extend from shore to form an outer harbor. The center pier extends SE from shore between the E and W piers and separates the outer and inner harbors. A dredged channel extends from the lake along the inner side of the E pier to facilities in the N part of the harbor. The E and W piers are marked at the outer ends by lights. A radiobeacon is at the E pier light. In 1984, the W pier was extended northeastward, thereby changing the harbor approach. In 1984, depths in the entrance channel were 11 to 16 feet. In 1977, depths of 15 feet were being maintained in the dredged area of the harbor basin inside the E pier. The basin is subject to shoaling.

Cobourg is a **Canadian customs port of entry.**

Wharves.–Cobourg has several public docking facilities. The Government wharf along the N side of the inner harbor has depths of 10 to 14 feet alongside except for a 7-foot spot at about its midlength. On either side of the S end of the center pier is a 250-foot berth. These berths have been dredged to 12 feet. The berth at the inner end of the E pier, 325 feet long, has depths of 14 feet alongside.

Supplies.–Fuel oil, diesel fuel, and general supplies are available at Cobourg. Minor repairs can be made.

Chart *2061.–Chemical plant silos on **Lucas Point** (44°57.5′N., 78°07.1′W.) are prominent.

From Cobourg, the shoreline extends ENE for about 22 miles to Presqu'ile Bay. A clay bank as much as 50 feet high skirts the shoreline for most of this stretch, and there is deep water from 0.5 to 1 mile offshore.

At **Ogden Point,** about 14.5 miles E of Cobourg, the T-head pier of a cement company extends SE into the lake. The 500-foot face has depths of 28 to 30 feet alongside. The pier, marked by a private light, is a shipping point for limestone.

Mulcaster Patch, 6.7 miles SW of Ogden Point, is an unmarked rocky ledge with a least depth of 36 feet.

Presqu'ile Peninsula, 8 miles E of Ogden Point, is a long peninsula extending SSE from shore to **Owen Point** and bending E to **Presqu'ile Point.** A chain of islands and shoal water extends 1.7 miles SW from Owen Point, terminating in **High Bluff Island,** marked on the SE side by a light. Shoals with a least depth of 7 feet extend 1.2 miles WNW from High Bluff Island. **Camel Shoal,** 1.2 miles SW of High Bluff Island, is an isolated rocky patch with a least depth of 13 feet. **Collier Shoal,** 3.2 miles W of High Bluff Island, is a rocky patch with a least depth of 16 feet.

Popham Bay, on the W side of Presqu'ile Peninsula N of High Bluff Island, has depths of 18 to 30 feet in the central part. Anchorage in the bay affords protection from N and SE winds, sand with rock bottom.

Chart *2031.–Presqu'ile Bay, a natural small-craft harbor at the W entrance to the Murray Canal, is protected on the W and S by Presqu'ile Peninsula.

Presqu'ile Point Light (43°59.9′N., 77°40.6′W.), 76 feet above the water, is shown from a white octagonal tower from Presqu'ile Point, the E end of Presqu'ile Peninsula.

Channels.–A narrow dredged channel leads NW into the bay between Presqu'ile Point and **Shoal Point.** The channel is marked by buoys and a **295°05′** lighted range. **Presqu'ile Middle Ground,** with a least depth of 5 feet, is on the NE side of the channel SE of Shoal Point. A shoal with depths of 1 foot extends S from Shoal Point to the channel edge. **Salt Reef,** which bares, is on the SW side of the entrance channel opposite Shoal Point and is marked by a light. In 1977, the channel had a controlling depth of 7 feet.

Caution.–Buoys in Presqu'ile Bay have been placed as in continuation from the Bay of Quinte through the Murray Canal to Lake Ontario. Therefore, when entering Presqu'ile Bay from Lake Ontario, red buoys must be left to port and black buoys to starboard.

Anchorage.–Mariners are cautioned that the holding ground in the bay is not always good. Protection is afforded from wave action, but the surrounding low-lying land does not give complete protection from winds.

Small-craft facilities.–A Government wharf with 2 to 3 feet alongside is on the SW side of the entrance channel W of Salt Reef. Gasoline and water are available. A marina in the NW part of the bay at the village of Brighton provides berths with electricity, gasoline, diesel fuel, sewage pump-out, and a 30-ton travel lift for hull and engine repairs. The privately maintained and marked channel to the marina has a reported controlling depth of 6 feet in 1981.

Murray Canal connects Presqu'ile Bay and the W end of the Bay of Quinte. It is 5 miles long from pierhead to pierhead, or about 7.5 miles including the cuts through shoals beyond the pierheads. The canal is marked at either end by a light on the N pierhead. In 1981, the controlling depth through the canal was 7 feet. The approach channels at either end have depths of 7 feet.

The canal is crossed by three swing bridges that have a minimum clearance of 8 feet. The navigable channel at each bridge is to the S of the swing.

A **speed limit** of 6 mph is enforced in the canal.

Charts 14800, *2061, *2060, *2064.–E from Presqu'ile Bay for 43 miles to the **Upper Gap** (44°07'N., 76°49'W.) entrance to the Bay of Quinte, the lakefront is the S side of **Prince Edward County,** an island separated from the mainland by Murray Canal and the Bay of Quinte.

Chart *2061.–Wellers Bay, about 3.5 miles E of Presqu'ile Bay, is separated from Lake Ontario and enclosed on its SW side by **Bald Head Beach,** a narrow strip of sandy beach. The partly tree-covered 20-foot dunes on Bald Head Beach are fairly prominent. Between Bald Head Beach and the mainland NW is a low island about 1 mile long. Wellers Bay is entered through channels on the N and S ends of this unnamed island. In 1977, it was reported that the N channel was completely closed by silting and dry at chart datum, and the S channel had a controlling depth of 1 foot. Comparatively deep water is inside Wellers Bay. Small-craft facilities are at the N end of the bay. A lighted 247-foot microwave tower about 1.7 miles NE of the bay is prominent.

There are several dangers in the approach to Presqu'ile Bay and Wellers Bay. **Gore Shoal,** 1.5 miles S of Presqu'ile Point, is rocky and has a least depth of 15 feet. **Quick Shoal,** 1.8 miles SE of Presqu'ile Point, is rocky and has a least depth of 15 feet. **Dobbs Bank,** about 3 miles SE of Presqu'ile Point, is fairly large in extent and has a rocky bottom with a least depth of 6 feet.

Caution.–A large area of submerged unexploded ordnance is NE of Dobbs Bank and in the SW part of Wellers Bay. Extreme caution is advised.

From the S entrance to Wellers Bay, the shoreline extends SE for about 8 miles to **Huyck Point.** Along this stretch, are several small points, three small bays separated from the lake by narrow sandbars, and irregular depths with shoals as much as 2 miles off; caution is advised.

There are several islands and shoals off Huyck Point. **Nicholson Island,** just SW of the point, is separated from it by a shallow passage about 0.8 mile wide. The channel has a greatest depth of 21 feet, but local knowledge is required. **Scotch Bonnet Island,** high and bare, is 1.2 miles SW of Nicholson Island and is marked by a light. **Scotch Bonnet Shoal,** 2.4 miles S of Scotch Bonnet Island, has a least depth of 13 feet. **McFaul Shoal,** 2 miles SSE of Huyck Point, is a pinnacle rock covered 18 feet. **Palen Bank,** 3.3 miles SSW of the point, is rocky with a least depth of 24 feet.

Charts 14800, *2060.–Wellington Bay is a large indentation between Huyck Point and **West Point (Owen Point),** 11 miles ESE. **Wellington, Ont.,** is a village on the N shore of the bay about 7 miles E of Huyck Point. A white water tank in the village is prominent. **West Lake** extends SE from Wellington and is separated from Wellington Bay by a narrow strip of land. A cut through the sandbar at the W end of West Lake leads to a wharf at Wellington. However, the channel dries and is navigable only by small boats at high water stages. Two narrow boulder ledges extend SW into Wellington Bay from the NE side of the bay. Ledges with depths of about 13 feet extend about 1 mile offshore.

Athol Bay opens between West Point and **Salmon Point (Wicked Point),** 3 miles SE. The bay affords anchorage in 36 to 42 feet, sand bottom, with fair protection in winds from N to SE. Salmon Point has a prominent, abandoned lighthouse. On the SE side of the point, a breakwater wharf in ruins with reported depths of 1½ feet alongside provides protection for small craft.

Wicked Bank is an unmarked rocky ledge extending 2 miles SW from Salmon Point. Depths less than 6 feet extend out 0.75 mile, and depths less than 18 feet extend out 1.4 miles.

From Salmon Point, the shoreline E for 4.7 miles to **Point Petre** is a shallow indentation known as **Soup Harbour. Point Petre Light** (43°50.3'N., 77°09.2'W.), 67 feet above the water, is shown from a red and white horizontally banded circular tower on the point. A fog signal and radiobeacon are near the light.

From Point Petre, the shoreline trends NE for 16 miles to Long Point. Along this stretch are several points and small bays of no importance. Submerged rocks and boulders extend 0.8 mile off and deep water is 1 to 1.5 miles off.

Charts *2060, *2064.–Long Point, the SE extremity of Prince Edward County, forms the S side of Prince Edward Bay. **Point Traverse** and **Prince Edward Point** form the NE and E extremities of Long Point. Prince Edward Point is marked by a light.

Long Point Harbour is a small-craft and commercial fishing harbor at the E end of Long Point just N of Prince Edward Point. A channel, marked by a buoy, leads to a Government wharf in the NE part of the harbor. In 1982, the controlling depth to the wharf was 2 feet, thence in 1979, 5½ to 7 feet alongside.

Prince Edward Bay is a large bight in the E side of Prince Edward County between Long Point and **Cressy Point,** 9 miles N. The entrance to the bay and the waters within are generally deep. The anchorage is good, and the bay is much used as a harbor of refuge, particularly in the fall. **Waupoos Island** is a partly wooded island surrounded by shallow water in the NW part of the bay. The passage W of the island has a least depth of 12 feet and leads to a Government breakwater-wharf at the settlement of **Waupoos** on the N shore of the bay behind the island. In 1972, the wharf had depths of 3 feet alongside. A ferry operates between this wharf and a similar facility on the NW side of Waupoos Island. **Green Islet,** 2 miles ENE of Waupoos Island, is small and low. A submerged boulder-strewn ledge surrounds the islet and is marked on the SE side by a buoy.

Charts 14802, *2064.–False Ducks Islands comprise **Timber Island,** 1.2 miles NE of Long Point, and **False Ducks Island,** 2.5 miles E of Long Point. Timber Island has deep water close-to except at the SW end where shoals extend 0.4 mile SW and are marked by a buoy. False Ducks Island also has deep water close-to except on the SW side where **Gull Bar,** with depths of less than 6 feet and several rocks awash, extends 2 miles SW. A small islet, 9 feet high, is on the NW part of the bank. A lighted buoy marks the E side of the bank, and a buoy marks the SW extremity. **False Ducks Light** (43°56.9'N., 76°47.9'W.), 67 feet above the water, is shown from a red and white horizontally banded hexagonal tower on the E end of False Ducks Island. A fog signal is at the light. Between Long Point and False Ducks Islands, a winding buoyed channel with a least depth of 9 feet leads to Prince Edward Bay. Anchorage is between Timber Island and False Ducks Island in 36 to 54 feet.

Traverse Shoal, 1.5 miles SE of Long Point, is a detached shoal with a least depth of 10 feet. A lighted buoy is off the S end of the shoal. An isolated rock covered 28 feet is 1.8 miles E of Traverse Shoal.

William Shoal, 1.4 miles SE of False Ducks Island, is about 1.8 miles long NE and SW and has a least depth of 14 feet. A lighted buoy is at the SW end. **Harris Shoal,** 2 miles E of William Shoal, has a least depth of 18 feet and is unmarked. **Psyche Shoal,** 1.2 miles ESE of Harris Shoal has a least depth of 22 feet and is marked on the S side by a lighted bell buoy.

Main Duck Island, about 11 miles E of Long Point and 8 miles W of Galloo Island, is about 2 miles long and 0.8 mile wide. The island is deep-to on the N side, but shoals extend 1.8 miles SW and 1 mile S and SE from it. The SE and SW extremities of the shoal water are marked by lighted buoys. **Main Duck Island Light** (43°55.9'N., 76°38.3'W.), 74 feet above the water, is shown from a white octagonal tower, upper portion red, on the W end of the island. A fog signal and radiobeacon are at the light. A rock covered 31 feet is 2.5 miles SW of the light. A cove on the N side of the island almost divides it in two. A small-craft harbor is in the cove. The channel to the small-craft harbor is marked by a **229°** lighted range and buoys. In 1979, the controlling depth was 5 feet in the channel leading to a wharf on the E side of the cove. The depth alongside the wharf is about 3 feet. Anchorage in 9 to 10 fathoms affording shelter from S winds may be found on the N side of the island.

Yorkshire Island is off the NE end of Main Duck Island. The passage between the islands is shoal. Together, Main Duck and Yorkshire Islands are known as **The Ducks.**

The main shipping routes to and from the St. Lawrence River lie between The Ducks and Galloo Shoal, 6 miles E. This passage has depths of 6 to 30 fathoms. The upbound shipping route lies between Main Duck Island and Psyche Shoal. When approaching this passage during low visibility, especially from the N, extreme caution is advised, because soundings give little or no indication of the outlying dangers.

Pigeon Island is a small island marked by a light 9.7 miles NNE of Main Duck Island and 3 miles NW of Charity Shoal. Shoals extend about 0.75 mile NE and SW of the island.

Charts *2064, *2069.–Bay of Quinte is a long, winding, narrow body of water between Prince Edward County on the S and the Canadian mainland on the N. The distance from the Upper Gap entrance to the city of Trenton near the head of the bay is about 50 miles. Also along the shores are the towns of Picton and Deseronto, and the city of Belleville. At the head of the bay, Murray Canal extends W to connect with Presqu'ile Bay. The Bay of Quinte and the Murray Canal completely separate Prince Edward County from the mainland.

Chart *2006.–The **Upper Gap** entrance to the Bay of Quinte is 2 miles wide between **Indian Point** (44°06.7'N., 76°50.7'W.), the NE extremity of Cressy Point, and **Pig Point,** the W extremity of Amherst Island. A shoal with a least depth of 15 feet is about 1.3 miles ENE of Indian Point. The deepwater channel through the gap is to the E of this shoal and is marked by lighted and unlighted buoys. Pig Point and Indian Point are marked by lights.

Adolphus Reach, between Cressy Point and the mainland, is the easternmost reach of the Bay of

Quinte. The reach is deep with the shores steep-to and generally bold. From Indian Point it extends SW for 5.5 miles and is more than 1 mile wide to **Cole Point** on the N shore. A prominent silo is close W of Cole Point. From Cole Point, the reach narrows and bends W for about 5.5 miles to **Youngs Point** (44°02.9'N., 77°03.1'W.).

Prinyer Cove is a well-sheltered narrow bay with depths of 12 to 18 feet on the S side of Adolphus Reach. A cannery wharf on the SE side of the cove is in ruins. A marina SW of the cannery wharf provides berths with electricity, gasoline, water, ice, sewage pump-out, and engine repairs. In 1982, depths of 4 feet were reported alongside the wharf.

Keith Shoal, with a least depth of 5 feet, extends 0.2 mile off the S shore of the reach 7 miles SW of Prinyer Cove and is marked by a lighted buoy. Between Keith Shoal and the shoal water extending S from **Lyons Island** opposite, the deep water of the reach is 0.6 mile wide. The shoals S of Lyons Island are unmarked.

Youngs Point is at the W end of the reach on the S side of a peninsula that separates Adolphus Reach from Carnachan Bay. A ferry operates between the point and the village of **Glenora, Ont.**, on the S shore opposite. The ferry wharf at Glenora has depths of about 17 feet alongside. A marina 0.5 mile W of the Glenora ferry wharf provides berths, electricity, gasoline, diesel fuel, ice, marine supplies, sewage pump-out, and a 2-ton hoist for hull and engine repairs. Depths of 3 feet are reported alongside the wharf.

W of Youngs Point, the Bay of Quinte widens considerably, forming a body of water somewhat triangular in shape. The W end of Adolphus Reach is in the SE corner; the S end of Long Reach, the continuation of the bay, is at the apex; and Picton Bay extends S from the SW corner. Carnachan Bay, Bygotts Bay, and Mallory Bay open on the NE side of the triangle.

Carnachan Bay extends 1.8 miles NE and is clear except for shoaling to less than 6 feet at the upper end. **Glen Island** is a long narrow island off the mouth of the bay 0.7 mile NW of Youngs Point. A buoy marks the SW limit of the shoals that extend off the W end of Glen Island. **Bygotts Bay**, immediately N of Carnachan Bay, is smaller, but provides more shelter for small craft. **Mallory Bay**, NW of Bygotts Bay, has general depths of less than 12 feet; the middle of the entrance has a 3-foot shoal. A lighted buoy marks the extent of the shoals off **Trampour Point** between Bygotts Bay and Mallory Bay.

Picton Bay, entered about 3 miles W of Youngs Point, is the S extension of the Bay of Quinte. The bay, about 3 miles long, narrows from about 0.7 mile wide at the mouth to only 200 feet wide at the S end. The bay has general depths of over 20 feet in the central part with the shores generally deep-to and gradually shoaler depths toward the head of the bay. **Conger Shoal**, on the W side of the bay about 1.3 miles above the entrance, has a least depth of 16 feet. The shoal is off the entrance to **Hallowell Mills Cove**.

The W side of Picton Bay has two deep-draft facilities. The Lake Ontario Cement Company wharf is on the W side at the entrance. Twelve dolphins parallel to the shore provide 1,000 feet of berthing space with 22 feet alongside. The buildings, towers, tanks, and stack of the plant are prominent in approaching Picton Bay. The Marmoraton Mining Company wharf, 1 mile SW, has 250 feet of berthing space with 25 feet alongside. An ore-loading tower on the wharf is prominent.

Picton Harbour, at the head of the bay, serves the town of **Picton, Ont.** A buoyed, dredged channel leads through the shallow water at the head of the bay around **Chimney Point**, on the W side of the bay, and **Brick Kiln Point**, on the E side of the bay, to the facilities at Picton. Chimney Point is marked by a private light. The channel is subject to silting, and vessels drawing less than 10 feet may, with caution, transit the channel to the marina at the head of the harbor.

Picton is a **Canadian customs port of entry.**

A **speed limit** of 5 mph (4.3 knots) is enforced S of Chimney Point.

Several public and private small-craft facilities in Picton Harbour provide gasoline, diesel fuel, water, ice, electricity, and sewage pump-out. The marina at the head of the harbor has depths of about 9 feet alongside.

Close W of Mallory Bay, the Bay of Quinte becomes narrow again, and **Long Reach** extends N for about 6 miles to Green Point. A lighted midchannel buoy SW of Mallory Bay marks the entrance to Long Reach. The midchannel portion of the reach has depths of 21 to 46 feet.

Thompson Point, near the S entrance to Long Reach, is the N extremity of the peninsula that forms the N side of Mallory Bay. **Hay Bay**, entered between Thompson Point and Shermans Point, extends about 10 miles NE from the S end of Long Reach. The bay is about 0.3 to 1.5 miles wide. There is deep water inside the entrance, but from near **Ram Island**, 3.5 miles above the entrance, the upper part of the bay shoals to 7 feet and less, with weeds. A marina on the S side of the bay 1.5 miles above Ram Island provides transient berths, gasoline, water, and ice.

Shermans Point, the N side of the entrance to Hay Bay, is marked by a light. A shoal with a least depth of 2 feet extends 0.5 mile S of the point and is marked on the SW side by a buoy.

A prominent 710-foot lighted transmitting tower is on the W side of Long Reach 2.5 miles above Shermans Point.

Hogsback Shoal, awash and marked by a buoy on the W side, is on the E side of Long Reach 2 miles N of Shermans Point. Above Hogsback Shoal, a shoal bank with depths less than 18 feet extends out about 0.3 mile along the E side of the reach. **Carman Shoal**, near the N end of the bank, has a depth of 17 feet. **Catalaque Shoal**, with depths less than 12 feet, is off the W shore of the reach 3.4 miles above Shermans Point. A lighted buoy marks the E side of the shoal.

Green Point (44°09.8'N., 77°03.6'W.) is on the W side of the N entrance to Long Reach 4 miles above Shermans Point.

Above Green Point, the Bay of Quinte widens out into **Mohawk Bay**. The bay has depths of 14 to 17 feet in the central part with lesser depths in the NE and SW ends and along the shore. **Foresters Island** is in the W part of the bay NE of **Grassy Point**. The SW side of the island and the point are almost joined by a low sandy spit covered with rushes. The navigable channel through the Bay of Quinte is around the NE end of Foresters Island where the buoyed channel bends WSW into Telegraph Narrows.

The **Napanee River** empties into the NE side of Mohawk Bay. A buoyed, dredged channel leads from the mouth upstream for about 5.5 miles to a highway bridge at the town of **Napanee**. In 1980, the channel had a reported controlling depth of 5 feet. Local knowledge or a pilot is required. Outside the channel, the river is filled with weeds. Overhead power cables with a clearance of 108 feet cross the river about 2 miles above the mouth. For safety reasons only vessels with a masthead height of 56 feet or less should pass under the cables. A Government wharf close W of the highway bridge has depths of 4 feet alongside.

The town of **Deseronto, Ont.**, is on the N shore of Mohawk Bay. A clock tower and a water tower in the town are prominent from the bay. The town wharf at Deseronto is reported to be in ruins. A marina protected by a breakwater is NE of the town wharf. Berths with electricity, gasoline, diesel fuel, water, ice, electricity, marine supplies, sewage pump-out, marine railways up to 200 tons, and hull and engine repairs are available. The marina has reported depths of 5 to 7 feet alongside. The channel to the marina is between submerged cribs that are marked by buoys.

Chart *2069.–From Mohawk Bay, the Bay of Quinte extends WSW to Telegraph Narrows. A fixed highway bridge with a clearance of 90 feet crosses the bay 1.3 miles WSW of Foresters Island. **Telegraph Narrows** extends from the bridge W for about 2 miles to the N side of **Telegraph Island**. A well-marked dredged channel is entered about 0.8 mile above the bridge and leads to deeper water W of Telegraph Island. The controlling depth in the channel is about 10 feet. Telegraph Island, attached to the S shore of the bay by a shoal that bares, is marked on the N side by a light.

Chart *2007.–From Telegraph Narrows, the bay has depths of about 16 to 20 feet and gradually widens for about 5 miles W to Big Bay. NW of Telegraph Island, **Sucker Creek** empties into the bay, and shoals off the mouth are marked on the SE side by a lighted buoy. **North Port Shoal**, with a least depth of 3 feet, is 3.7 miles WSW of Telegraph Island and marked on the N side by a lighted buoy.

Trident Point (44°09.3'N., 77°12.8'W.), 1 mile NW of North Port Shoal, is the N entrance point to Big Bay. A detached 11-foot shoal S of the point is marked by a buoy, and a shoal bank with depths of 9 feet extending 0.8 mile SW from the point is marked by a lighted buoy.

W of Trident Point, the Bay of Quinte widens out to form **Big Bay**. The SE shore of Big Bay is formed by **Big Island**. Shoaling to 3 feet extends as much as 0.5 mile off the N shore of Big Island into Big Bay. A marina in a small basin on the N side of the island provides gasoline, diesel fuel, sewage pump-out, marine supplies, a 15-ton marine railway, and hull and engine repairs. **Big Island Shoal**, with a least depth of 4 feet, is a detached shoal off the NW end of Big Island, 3.6 miles SW of Trident Point.

Muscote Bay extends S from Big Bay W of Big Island. It has depths of 6 to 10 feet in the central part, but shallows toward the shores with weed growth in the S part. **Hungry Bay**, with depths less than 12 feet, is the NE part of Big Bay. **Salmon Island** is off the mouth of the **Salmon River**, which empties NW of Hungry Bay. Shoaling to 4 feet extends 1.7 miles SW from Salmon Island and is marked on the S end by a buoy.

The village of **Point Anne, Ont.**, is on the NW entrance point to Big Bay. A slip about 1 mile NE of the village is in ruins. **Minnie Blakely Shoal**, with a depth of 3 feet, extends S from just W of the slip, and is marked off the S end by a lighted buoy. Shoals extending NE from **Horse Point**, the SE entrance point to Big Bay, are marked by a buoy.

W of Big Bay, the Bay of Quinte again narrows for a distance of about 1 mile, then widens into a bay about 3 miles long. The city of Belleville is at the NW end of this bay.

The narrows W of Big Bay is formed by **Massasauga Point** on the S side and **Ox Point** on the N side. **Rush Bar**, part of which dries, is just W of Massasauga Point and is marked on the N side by a lighted buoy. A small islet is 0.2 mile W of Ox Point with shoals between.

The bay W of Ox Point has depths of about 14 feet in the central part with shoals extending out from the N and S shores. **Snake Island**, 7 feet high, is 0.6 mile W of Ox Point and is surrounded by shallow water. A 4-foot-high rock is close NE of the island. Chemicals are discharged at an offshore wharf on the N side of the bay. The wharf has depths of 8 feet alongside. A crib that uncovers 1 foot is close SE of the wharf. The building, water tank, and stack at the chemical plant close N of the wharf are prominent.

Belleville Harbour, serving the city of **Belleville, Ont.**, is at the mouth of the **Moira River** about 11 miles from the head of the Bay of Quinte. It is the most important commercial and industrial port in the bay. A clock tower in the city and a tank farm just E of the harbor are prominent from the bay.

Channels.–A dredged channel marked by buoys leads from the bay to the deep-draft Government wharf on the E side of the river mouth. The channel has a controlling depth of about 12 feet.

A buoyed natural channel leads from W of the

Government wharf through the mouth of the Moira River to a marina on the W side 0.4 mile above the mouth.

Caution.–An area of very shoal water extends off the W side of the mouth of the Moira River. Small craft without local knowledge approaching Belleville Harbour from the W are advised to use the buoyed channel.

Bridges.–A railway bridge crossing the Moira River 0.5 mile above the mouth marks the upstream limit of navigation on the river.

Towage.–One tug is available at Belleville.

Belleville is a **Canadian customs port of entry.**

Harbor regulations.–The harbor is administered by the Belleville Harbour Commission. Copies of the regulations are available from the Secretary-Treasurer, Belleville Harbour Commission, Belleville, Ont.

Wharves.–The L-shaped Government wharf extends 500 feet from the E side of the river mouth with a 170-foot outer face. Depths are 11 to 13 feet along the W side of the wharf where tankers discharge. The outer end of the wharf has a cargo shed.

Supplies.–Ships stores are available in the city. Tank trucks deliver diesel fuel.

Repairs.–Machine shops in the city make ordinary repairs.

Small-craft facilities.–A small-craft basin enclosed by breakwaters is on the E side of the Government wharf. A light marks the W side of the entrance to the basin. In August 1984, a rock covered 1 foot was reported in the marina entrance in about 44°09'11.3"N., 77°22'32.5"W. Mariners should favor the E side of the entrance. In 1978, the W part of the basin had depths of 10 feet. Marinas in the basin on the E side of **Victoria Park** and on the W side of the river provide berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, sewage pump-out, a 20-ton marine railway, and hull and engine repairs.

Just W of the mouth of the Moira River, a fixed highway bridge with a clearance of 75 feet, crosses the Bay of Quinte between **Zwick Island** on the N shore and **Hennessy Point** on the S shore. In September 1985, it was reported that much of the remains of a former bridge and causeway are W of the fixed bridge; mariners are advised to use the marked channel.

Chart *2069.–From Hennessy Point, the Bay of Quinte extends SW for 6 miles to Makatewis Island. This stretch has depths of 13 to 18 feet at midchannel except for a few offlying dangers. **Anderson Shoal,** with a depth of 4 feet, is marked on the N side by a buoy 2.3 miles SW of the Bay Bridge. Two unmarked shoals of 11 and 12 feet are off the S shore of the bay 1.4 and 1.8 miles SW of Anderson Shoal, respectively.

Makatewis Island is off the N shore of the bay 6 miles SW of the Bay Bridge. **Narrows Shoal,** with a rock that uncovers 3 feet and with depths of 5 to 12 feet, extends SW from the island almost completely across the bay to **Pine Point** on the S shore. **The Narrows** is the channel between Narrows Shoal and Pine Point. It is well marked and had a reported controlling depth of 12 feet in 1972.

Charts *2069, *2031.–From The Narrows to its head, the Bay of Quinte is generally shallow with several dangers. A small 8-foot shoal is 0.6 mile WSW of **Way Point** on the S side of the bay. About 1.8 miles SW of Way Point, **Indian Island Bank** is a narrow shoal lying E and W between **Onderdonk Point** and **Indian Island.** The grassy shoal has depths of 1 to 6 feet and is marked on the E end by a lighted buoy. A 7-foot spot is 0.4 mile NNW of Onderdonk Point. A channel with a least depth of about 7 feet leads along the S shore of the bay from The Narrows to the entrance to the Murray Canal, which connects with Presqu'ile Bay to the W.

On the N shore of the bay, a causeway connects **Baker Island** and **Meyers Point.** NE of Baker Island a buoyed channel with a depth of 5 feet leads to a rescue launch wharf on the E side of Meyers Point.

The town of **Trenton, Ont.,** is on the NW side near the head of the bay at the mouth of the **Trent River.** It is the E terminus of the Trent-Severn Waterway.

Channels.–A well-buoyed channel leads from The Narrows through the shallow water at the head of the Bay of Quinte to the mouth of the Trent River. In 1974, the controlling depth in the channel was 7 feet.

Bridges.–Four bridges cross the Trent River at Trenton. From the mouth of the river, the first and third are swing bridges with clearances of 8 and 10 feet, respectively. The second and fourth are fixed bridges with clearances of 25 and 43 feet, respectively. An overhead power cable across the S draw of the first bridge has a clearance of 37 feet.

Trenton is a **Canadian customs port of entry.**

Wharves.–Just S of the first bridge, on the W side of the river, a 219-foot Government wharf has depths of 3 to 4 feet alongside. The SE face of this wharf is 136 feet long with depths of 3 to 4 feet alongside. A 530-foot wharf on the E side of the river opposite the Government wharf has depths of 8 to 9 feet alongside. In 1972, this wharf was reported to be in ruins.

Small-craft facilities.–Berths, electricity, gasoline, diesel fuel, water, ice, sewage pump-out, a launching ramp, and hull and engine repairs are available.

A **Rescue Coordination Center** is at the Canadian Forces base at Trenton. It is the headquarters of a coordinated network of agencies trained to search for and aid vessels in distress. The Canadian Coast Guard maintains a continuous watch at this center. Requests for assistance from vessels in Canadian waters should be directed to this center by telephone, 613-392-2811, extension 3870 or 3875, or via the nearest Canadian Coast Guard radio station, or by other available means. In U.S. waters, search and rescue facilities and activities are provided and controlled by the U.S. Coast Guard.

Charts *2015, *2021–*2026, *2028, *2029.–The **Trent-Severn Waterway** connects Trenton on the

Bay of Quinte with **Port Severn** on Georgian Bay by a series of well-marked navigable rivers, lakes, and canals about 240 miles long. From Trenton, the waterway ascends 598 feet through 33 locks to Balsam Lake, then descends 264 feet through 9 locks and a marine railway to Georgian Bay. It follows the Trent River, Rice Lake, the Otenabee River, and the Kawartha Lakes to Balsam Lake at the summit, and then descends through lakes, rivers, and canals including Lake Simcoe, Lake Couchiching, and the Severn River to Georgian Bay.

The controlling depth in the waterway is 6½ feet from Trenton for 90 miles to Peterborough, thence 6 feet for 143 miles from Peterborough to Big Chute. At **Big Chute,** a power station and its dams block the waterway. Two marine railways serve to lift vessels 57 feet across a narrow neck of land to the pool above the power station. The largest railway limits drafts to 6 feet and can handle 100-ton vessels up to 100 feet long and 24 feet wide. From Big Chute for the remaining 8 miles to Georgian Bay the controlling depth is 6 feet.

From Trenton to Big Chute, the locks have a useable width of 32.5 feet and a useable length of 110 feet for square-built scows and 127 feet for standard-built vessels not exceeding a 21-foot beam. From Big Chute to Georgian Bay, the locks have a useable width of 25 feet.

The minimum vertical clearance of bridges and cables over the waterway is 22 feet at normal pool levels. The least recorded clearance during high water stages is 15 feet.

Numerous branch channels diverge from the waterway through the lake section. The depths in these channels vary. The most important branch is the Scugog Branch which connects the S end of Sturgeon Lake, 148 miles from Trenton, with Port Perry, 35 miles S, via the Scugog River and Lake Scugog. The controlling depth in this branch is 4 feet. A lock in the Scugog River has a useable length of 120 feet and width of 33 feet with 6 feet over the sills. The minimum vertical clearance under bridges and cables in the river is 10 feet with a least recorded clearance during high water stages of 8 feet.

Regulations.–Canal regulations and other waterway-related information may be obtained from the Superintendent, Parks Canada, Ashburnham Drive, P.O. Box 567, Peterbourough, Ont. K9J 6Z6. Mariners are required to have a copy of the regulations on board at all times. A speed limit of 6 mph (5.2 knots) is enforced in all sections of the waterway less than 150 feet wide. Speed limits in other sections of the waterway are designated by signs attached to white buoys along the channel edge or to signposts along the shoreline.

For complete information on the Trent-Severn Waterway, consult the Trent-Severn Waterway Small-craft Guide, published by the Canadian Hydrographic Service.

Chart *2005.–North Channel is the E extension of the Bay of Quinte, E of Upper Gap between Amherst Island and the mainland. The channel is generally deep except for shoals along the shore and an extensive shoal area extending N and E from the E end of Amherst Island.

On the N shore opposite the W end of Amherst Island, the buildings and stack of the Canada Cement Lafarge plant are prominent. The plant has a 500-foot offshore loading berth.

The village of **Bath, Ont.,** is on the N side of a small unnamed bay 1.7 miles NE of the cement plant. Shoals marked by a lighted buoy extend S from **Bath Point,** the E entrance point to the bay. A marina at Bath provides berths with electricity, gasoline, ice, water, sewage pump-out, and a 16½-ton marine railway for hull and engine repairs.

Millhaven Creek flows into the channel 1.7 miles NE of Bath Point. At the village of **Millhaven, Ont.,** on the W side of the mouth, a 98-foot Government wharf has depths of 13 feet alongside. A ferry operates between the wharf and the village of Stella on Amherst Island.

About 1.7 miles NE of Millhaven Creek, Canadian Liquifuels Ltd. has a 450-foot wharf marked by a private light with depths of 36 feet off the outer end. The buildings and water tank at the plant are prominent.

NE of the fuel wharf, **Parrots Bay** opens on the W side of **Nicholsons Point.** A spit with a least depth of 16 feet makes out from the SE side of the bay. Nicholsons Point is marked by a light.

Collins Bay opens into North Channel about 3.2 miles NE of Nicholsons Point. The bay extends about 2 miles NNE to the village of **Collins Bay, Ont.,** and provides well-sheltered anchorage in 24 feet in the central part with shallower depths toward the head. The ruins of a wharf are on the W side near the entrance. Marinas at the head of the bay provide berths, electricity, gasoline, ice, hoists, sewage pump-out, and hull and engine repairs; depths of 2 to 5 feet are reported alongside.

Amherst Island is a large island in the NE part of Lake Ontario separated from the mainland by, and forming the S shore of, North Channel. From **Pig Point** at the W end of the island NE to Kerr Point, shallow water extends as much as 0.3 mile offshore. **Berdans Shoal,** 2.7 miles NE of Pig Point, has a least depth of 3 feet and is unmarked. **Kerr Point,** about midlength of the island, extends NE to enclose **Kerr Bay. Kerr Point Shoal,** which bares, is on the NW side of Kerr Point and is marked on the N side by a buoy. About 1 mile E of Kerr Point, **Stella Point** encloses **Stella Bay.** The village of **Stella, Ont.,** is at the head of the bay. The Stella Government wharf is on the W side of the point and has depths of 13 feet alongside. A ferry operates between the wharf and Millhaven on the mainland.

At the NE end of Amherst Island, **Sand Bay** is enclosed on the E side by **Amherst Bar.** This bar, which bares, extends N to the Brother Islands. The islands are near the N edge of an extensive shoal bank that extends 1.5 miles N and 2 miles E from the NE end of Amherst Island. The bank has depths as little as 2 feet and numerous submerged rocks. **Salmon Island,** 2 miles ESE of **Centre Brother Island,** is on the NE edge of the bank. A lighted buoy 0.8 mile SE of Salmon Island marks the SE extent of the shoal bank. The N extent is marked by buoys NNE and NW of Salmon Island and by lights on Centre Brother Island and the W Brother Island. Vessels are cautioned to not pass S or W of Salmon Island.

The SE shore of Amherst Island from its E end SW to **Emeric Point** (44°06.2'N., 76°42.2'W.) has no landing places, and shallow water extends as much as 0.7 mile offshore. There are several detached offlying dangers along this stretch. An unmarked 30-foot spot is 3 miles NE of Emeric Point, a shoal with a least depth of 24 feet and marked on its SE side by a lighted buoy is about 2.5 miles E of the point; an unmarked 27-foot shoal is 2.2 miles SE of the point. **Big Bar Shoal,** with a least depth of 9 feet and unmarked, is about 3 miles SSW of Emeric Point.

The S shore of Amherst Island from Emeric Point W to Pig Point is indented by several shallow bays, and shallow water extends about 1.5 miles offshore. **Long Point Bay** is on the W side of Emeric Point. **Nut Island,** 1 mile W of Emeric Point, is connected to Amherst Island by a drying bar and separates Long Point Bay and **Amherst Bay. Wemps Bay** is about 2 miles W of Amherst Bay. **Grape Island** is off the E entrance point to the bay. A lighted buoy, 2 miles S of Grape Island, marks the W end of a 24-foot shoal. **Bluff Point** is the W entrance point to Wemps Bay. Deep water is close to the shoreline between Bluff Point and Pig Point 0.8 mile NW.

From Collins Bay at the E end of North Channel eastward to the entrance to the St. Lawrence River, the mainland shoreline is a series of small bays. **Horsey Bay** has two indentations that provide little protection except from N winds. A buoy marks shoals extending 0.4 mile off **Everett Point,** on the E side of Horsey Bay.

Charts *2005, 14768.–Cataraqui Bay, with depths of 4 to 13 feet, is 1.7 miles E of Everett Point on the N side of the entrance to the St. Lawrence River. The bay is between **Carruthers Point** on the W and **Samson Point** on the E. A breakwater extends E from Carruthers Point across the mouth of the bay to protect facilities on the NE side of the bay. A lighted buoy off the E end of the breakwater marks the W side of a dredged channel that leads to the facilities. The channel has a controlling depth of about 22 feet and is marked by buoys. Small craft have good shelter in the bay in depths of 8 feet. It is reported that rock patches make the holding ground uncertain.

The Canadian Steamship Lines elevator wharf extends from the NE shore of Cataraqui Bay. The E side of the wharf is 642 feet long with a depth alongside of 24 feet in 1979. Two traveling marine towers unload vessels at a rate of 35,000 bushels per hour to a 2½-million-bushel elevator. In 1969, the W side of the wharf had depths of 18 to 19 feet alongside. To the E of the elevator wharf, a 17-foot channel has been dredged to the W side of the James Richardson wharf.

Portsmouth Harbour, a small cove 0.7 mile E of Samson Point is protected by a breakwater, marked at its outer end by a light, extending SE from the Government wharf on the W side of the entrance; a floodlighted breakwater extends E from the wharf, and another floodlighted breakwater extends NW on the SE entrance to the harbor. The harbor has general depths of 4 to 14 feet with a depth of 18 feet in the entrance. Depths of 7 to 8 feet are along the inner face of the Government wharf.

Penitentiary Shoal, 0.6 mile SSE of Portsmouth Harbour, has a least depth of 11 feet and is marked on the N side by a lighted buoy. In June 1981, an unmarked 33-foot spot was reported about 0.5 mile W of the shoal in about 44°12'33"N., 76°31'20"W.

Simcoe Island is in the entrance to the St. Lawrence River off the NW end of Wolfe Island S of Portsmouth Harbour. **Nine Mile Point Light** (44°09.1'N., 76°33.4'W.), 53 feet above the water, is shown from a white circular tower, red band at the top, from **Nine Mile Point** at the SW end of Simcoe Island. A fog signal is at the light. **Boat Channel** is a deep narrow passage between the SE side of Simcoe Island and Wolfe Island. At the head of the channel, a shallow bank with submerged rocks extends from the NE end of Simcoe Island to Wolfe Island. A **cable ferry** operates from the municipal wharf on the SE side of Simcoe Island across Boat Channel to Wolfe Island. The wharf is marked by private lights. In 1984, the wharf was reported to be in disrepair and usable only by the ferry.

Lower Gap is the entrance to the St. Lawrence River between Simcoe Island and Amherst Island to the W. Extensive shoals in Lower Gap extend off the NW side of Simcoe Island. The NW limit of these shoals is marked by buoys. **Melville Shoal,** which partly bares, is 2 miles NW of Nine Mile Point. A **046°09'** lighted range marks the channel through Lower Gap on the NW side of Melville Shoal. **Middle Ground,** with a least depth of 12 feet, is 2 miles N of Nine Mile Point. **Snake Island** is a small island on the NW part of **Snake Island Bank,** which lies 1 mile NW of **Four Mile Point,** the NW extremity of Simcoe Island. Snake Island Bank has a least depth of 2 feet and is connected to the N end of Simcoe Island by a bank with depths of about 7 to 16 feet.

6. LAKE ERIE

Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake Erie is an elevation 568.6 feet above mean water level at Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955). (See Chart Datum, chapter 1.)

Dimensions, Etc.

Length, steamer track, Detroit River Lighthouse to Buffalo; 236 miles.

Length (right line), clear of Point Pelee and Long Point; 241 miles.

Breadth (right line), Ashtabula to Port Talbot; 57 miles.

Depth, maximum recorded by NOS; 210 feet.

Water surface of lake; 4,980 square miles (U.S.), 4,930 square miles (Canada).

Entire drainage basin; 22,980 square miles (U.S.), 9,650 square miles (Canada).

General description.–**Lake Erie** is the southeasternmost and fourth largest of the five Great Lakes. With a greatest depth of 210 feet, it is the shallowest of the lakes and the only one with a floor above sea level. The deepest part of the lake is generally at the E end, while the island region in the W part of the lake is the most shallow. The lake has an average depth of 62 feet. The lake is fed at the NW end by water from Lake Huron via St. Clair River, Lake St. Clair, and Detroit River. The only natural outlet of the lake is at the NE end through Niagara River. Welland Canal bypasses the falls and rapids of Niagara River and provides a navigable connection to Lake Ontario.

The waters of Lake Erie E of Long Point are part of the St. Lawrence Seaway and are under the navigational control of the Saint Lawrence Seaway Development Corporation, a corporate agency of the United States, and the St. Lawrence Seaway Authority of Canada. These agencies issue joint regulations covering vessels and persons using the Seaway. The regulations are codified in 33 CFR 401, and are also contained in the Seaway Handbook, published jointly by the agencies. A copy of the regulations is required to be kept on board every vessel transiting the Seaway. A schedule of the Seaway tolls is contained in the handbook. (See St. Lawrence Seaway, chapter 3, and **33 CFR 401**, chapter 2.)

Extensive waterborne commerce is carried out between the ports on the lake as well as to and from the other lakes. The bulk of commerce on the lake radiates from the mouth of Detroit River to the various ports on the lake, to the Niagara River, and to Welland Canal. Most of the vessel traffic proceeds from the Detroit River through the N part of the island region and Pelee Passage. This is the most important channel of the lake. Vessels plying between Lake Erie and Lake Ontario are restricted in size by the locks in the Welland Canal; the maximum vessel dimensions are 730 feet overall length, 76 feet extreme breadth, and 26 feet draft.

Vessel traffic control.–Lake Erie E of Long Point is Sector 7 of the St. Lawrence Seaway vessel traffic control system. The objective of the system is to provide safe and efficient scheduling of vessel traffic, efficient search and rescue coverage, information regarding pilot requirements to the pilot dispatch centers, marine weather broadcasts, and information on vessel location to all interested parties. St. Catharines traffic control center controls traffic in Sector 7 through "Seaway Long Point," VHF-FM channel 11 (156.55 MHz).

Calling-in point.–Upbound and downbound vessels shall contact "Seaway Long Point" on VHF-FM channel 11 when approximately abeam of the E end of Long Point, Ont. After initial contact, downbound vessels shall guard VHF-FM channel 16 (156.80 MHz).

Complete information on the traffic control sectors and their respective calling-in points is contained in the Seaway Handbook.

Vessel Traffic Service.–The Canadian Coast Guard operates a Vessel Traffic Service in Canadian waters from Long Point in Lake Erie through the Detroit and St. Clair Rivers to De Tour Reef Light in Lake Huron. (See chapter 3 and the Annual Edition of Canadian Notices to Mariners for complete information.)

Fluctuations of water level.–The normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and fall, the lowest stages prevailing during the winter and the highest during the summer.

In addition to the normal seasonal fluctuations, oscillations of irregular amount and duration are also produced by storms. Winds and barometric pressure changes that accompany squalls can produce fluctuations that last from a few minutes to a few hours. At other times, strong winds of sustained speed and direction can produce fluctuations that last a few hours or a day. These winds drive forward a greater volume of surface water than can be carried off by the lower return currents, thus raising the water level on the lee shore and lowering it on the windward shore. This type of fluctuation has a very pronounced effect on Lake Erie, because it is the shallowest of the Great Lakes and affords the least opportunity for the impelled upper water to return through lower return currents beneath the depth disturbed by storms. As a result, the water level in the harbors, particularly those at the ends of the lake, fluctuates markedly under the influence of the winds; the amount of fluctuation depends on the direction, strength, and duration of the wind. Fluctuations as great as 10 feet and lasting as long as 12 hours have been observed. September through April is the most likely period, particularly November, December, and January. At the E end of the lake, W winds pile up water in Buffalo Harbor and increase the depth in Niagara River, while E winds drive the water out of Buffalo Harbor and decrease the flow and depths in Niaraga River. The winds produce exactly the opposite effect at the W end of the lake; the greatest effects are at Sandusky, Toledo, and the mouth of Detroit River. Intermediate points are not subject to level changes as great as those at the ends of the lake. Along the S shore, fluctuations caused by winds are generally less than 1 foot above or below normal; extreme fluctuations of about 2 feet above or below normal may occur.

Water level information for the Buffalo area may be obtained by contacting Buffalo Coast Guard Group on VHF-FM channel 16 (156.80 MHz); for the Toledo area by contacting Toledo Coast Guard Station, same channel; for the Gibralter area by contacting Detroit Coast Guard Group, same channel. The information is given in whole inches above or below chart datum.

Weather.–Strong winds are mostly likely in autumn during the navigation season; November and December are the worst as gales blow 6 to 9 percent of the time. However, Lake Erie's maximum wind occurred in July, NNW at 87 knots. Reported by two vessels, these winds were triggered by an Independence Day (1969) squall line. Gales, however, are encountered less than 1 percent of the time from May through September. Summer winds blow mainly out of the S through W, particularly SW. These directions are also favored during other seasons along with northwesterlies and northeasterlies.

The shallowness and orientation of Lake Erie make it susceptible to SW and NE winds, which can quickly raise dangerous seas and, if persistent, create a dangerous surge problem at both ends of the lake. Rough seas are most frequent in autumn and in the E half of the lake. Waves of 10 feet or more can be expected up to 3 percent of the time in the E, while seas of 5 feet or more are encountered 30 percent of the time lakewide; extremes of 15 to 20 feet have been encountered.

Poor visibility is mainly a spring and autumn navigational problem. Over open waters, spring is the most prevalent fog season. Visibilities of less than 0.5 mile occur up to 5 percent of the time. Visibilities of 2 miles or less occur 5 to 10 percent of the time during most of the navigation season. The shoreline is susceptible to both autumn radiation fogs and early spring advection fogs. Fog is more frequent along the N shore.

Simcoe's visibilities drop to less than 0.5 mile on an average of 46 days annually compared to a range of 15 to 23 days along the S shore. At Simcoe this includes about 4 to 6 days of fog per month in autumn and early spring, about twice as many days as Buffalo, Erie, or Toledo.

Thunderstorms are responsible for some of the strongest winds on the lake. They are generally a problem from April through September, but can occur at any time. Over the open lake, they occur 1 to 3 percent of the time with a peak during the summer months. They are most likely between sunset and sunrise. Onshore they most often occur during the late afternoon, on 25 to 30 days annually. During June, July, and August, they blow on 5 to 10 days per month.

Ice.–The W end of Lake Erie is very shallow and freezes rapidly, the time of occurrence depending heavily on the temperatures. The ice attains an average thickness of 7 inches and an average maximum thickness of 11 inches. In Maumee Bay, the ice forms a solid sheet about 12 to 18 inches thick. The track through the channel to Toledo remains open except for a 3-foot thickness of brash ice, a slush ice under the refrozen surface. In South Passage, the ice reaches a thickness of about 18 inches because of slight rafting and ridging. During severe winters, thicknesses to 24 inches and windrows 5 feet high have been observed. By mid-March, the ice in the W end of the lake starts to clear because of the temperatures and the prevailing W winds. The ice in this area is field ice and covers over an opened track.

The central part of the lake remains open through January except for a few strips of thin ice. Growth is rapid in February, and high concentrations of thin ice develop by mid-month. By early March, medium-thickness lake ice predominates, with somewhat better conditions along the Canadian shore. Decay and clearing is rapid in mid-March, and the remaining pack is usually concentrated E of Long Point by the end of the month.

In the E part of the lake, ice begins to form in early to mid-January and may reach a thickness of 8 to 12 inches by the end of the month. The solid ice increases to 16 to 20 inches thick by the end of February. In Buffalo Harbor, an average thickness of 9 inches and an average maximum thickness of 18 inches can occur. In the lake, the prevailing W winds usually jam and pack the ice to form considerable windrows. Extremely hard pressure ridges 3 to 4 feet thick are not uncommon in February and March. As the ice on the rest of the lake begins to break up, the winds force it into the E end of the lake, and it completely blocks the approach to Buffalo Harbor. The soft deteriorating ice forms mush ice about 3 to 6 feet deep, interspersed with pressure ridges 4 to 6 feet deep. The mush ice has been reported as much as 20 feet deep in places. Rafted ice fields 15 to 20 feet above the water level have occurred during severe winters; under these conditions, ice can persist thought late May. (See Winter Navigation, chapter 3.)

Submerged wellheads and pipelines.–Mariners are cautioned that oil and gas drilling towers are temporarily established in various parts of Canadian waters of Lake Erie. These towers have a quick flashing white light and an automatic fog signal that sounds one blast of 2 seconds duration followed by 18 seconds of silence.

There are many submerged gas pipelines and wellheads in Canadian waters Lake Erie. Most of them are shown on the charts. Damage to these structures can be extremely hazardous because the natural gas if flammable, is under pressure, and contains toxic chemicals. Mariners are cautioned not to anchor in the vicinity of the submerged structures.

Fish netting areas.–In parts of Lake Erie that are intensively fished, gill nets, impounding nets, and trap nets may create a hazard to navigation. The areas most intensively fished and the principal type of nets employed are shown in an inset on NOS chart 14820. However, fishing gear may be encountered at any location in the lake.

Routes.–The Lake Carriers' Association and the Dominion Marine Association have prescribed, for vessels enrolled in the associations, the following separation of routes for upbound and downbound traffic in Lake Erie.

Downbound: Vessels leaving the Detroit River for ports E of Middle Ground Shoal shall continue on course 164° until 0.9 mile beyond East Outer Channel Lighted Buoy 1, thence 27 miles on 095½° for Pelee Passage Traffic Lighted Bell Buoy, thence 122° to pass S of Southeast Shoal Light.

Downbound vessels for Port Colborne or Buffalo from point of departure, Southeast Shoal, shall lay a course to a point not less than 9 miles off Long Point, thence to destination.

Upbound vessels from Port Colborne or Buffalo, bound to Southeast Shoal, lay a course to pass not more than 3 miles off Long Point, thence to Southeast Shoal.

Upbound vessels from Port Colborne or Buffalo to a point on the S shore of Lake Erie, E of Marblehead, lay a course to pass not over 5 miles off Presque Isle Light, thence to destination.

Upbound vessels for Detroit River, departing from a position 1 mile S of Southeast Shoal Light, shall steer 302° for 8.5 miles to a position 2 miles 329½° from Pelee Passage Light, thence 26 miles on 275½° for East Outer Channel Lighted Buoy 1.

For Toledo and Monroe, when 1 mile off Pelee Passage Light, steer 272° to pass about 1.5 miles off Middle Sister Island Light, thence to destination.

It is understood that masters may exercise discretion in departing from these courses when ice and weather conditions are such as to warrant it. The recommended courses are shown on chart 14820, Lake Erie.

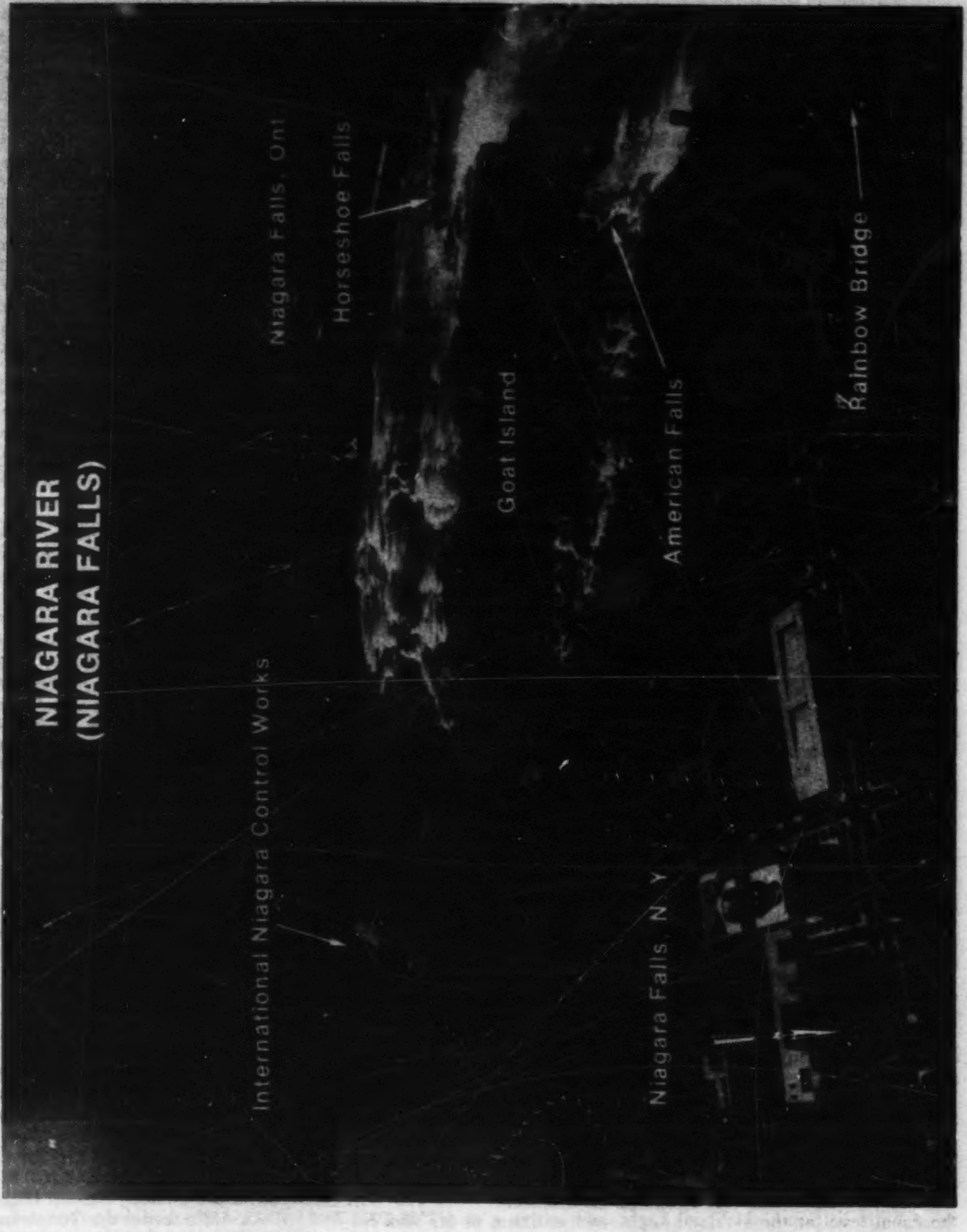
Pilotage.–The following waters of Lake Erie are Great Lakes designated waters: in the approach to Welland Canal within an arc drawn 1 mile to S of the outer light on the W breakwater at Port Colborne (Port Colborne Outer Light); W of a line on a bearing of about 026° from Sandusky Harbor Pierhead Light to Southeast Shoal Light; and within a radius of 1 mile E of Sandusky Harbor Pierhead Light. Registered vessels of the United States and foreign vessels in these waters are required to have in their service a United States or Canadian registered pilot. The remaining waters of Lake Erie are Great Lakes undesignated waters; the above vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great Lakes undesignated waters. Registered pilots for the Welland Canal are supplied by Great Lakes Pilotage Authority, Ltd., St. Catharines, and for Lake Erie by Great Lakes Pilotage Authority, Ltd., St. Catharines, and Lakes Pilots Association. (See appendix for addresses.) Pilot exchange points are 1 to 2 miles S of Port Colborne and just below the Ambassador Bridge on the Detroit River. The pilot boat in the Detroit River, J. W. WESTCOTT II, has a black hull encircled by an orange band and a white cabin with the words "U.S. Mail" in black letters. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

Principal ports.–The principal ports on Lake Erie are Buffalo, N.Y.; Erie, Pa.; and Conneaut, Ashtabula, Fairport Harbor, Cleveland, Lorain, Huron, Sandusky, and Toledo, Ohio. Companies at several of the ports make above-the-waterline repairs to deep-draft vessels.

Charts 14822, 14832, 14833.–Niagara River above Niagara Falls.–At its E end, Lake Erie becomes comparatively narrow and has its outlet in the Niagara River. From the head of the river, it is about 20 miles to the falls and rapids of **American Falls** and **Horseshoe Falls**. About 5 miles below the head, the river is divided into two channels by **Strawberry Island** and **Grand Island. Tonawanda Channel** and **Niagara River Channel**, the U.S. channels, lead to the E of these islands, and **Chippawa Channel**, the Canadian channel, leads to the W of these islands. At the lower end of Grand Island, the channels rejoin and lead for about 3.5 miles to the falls.

The **International boundary** between the United States and Canada follows a general middle of the river course in the upper Niagara River from the head of the river downstream to the head of Grand Island where the river forks around the island. The boundary then follows Chippawa Channel and is generally less than 1,000 feet off the W shore of Grand Island until Chippawa Channel and Niagara River Channel join at the NW end of Grand Island. The boundary again follows a general middle of the river course around the S side of **Goat Island** and over **Niagara Falls**.

Depths and vertical clearances under overhead cables and bridges in the upper Niagara River are referred to the sloping surface of the river when the water level elevations are 568.6 feet, Low Water Datum, on Lake Erie, 563.7 feet at the lower entrance to the Black Rock Canal (42°56.0'N., 78°54.5'W.), 563.0 feet at the Huntley Station Gage (42°58.2'N., 78°55.9'W.), 562.5 feet at the Tonawanda Island Gage (43°01.7'N., 78°53.2'W.), and 560.7 feet at the Niagara Intake Gage (43°04.7'N., 79°00.9'W.). All elevations are above mean water


NIAGARA RIVER
(NIAGARA FALLS)
International Niagara Control Works
Niagara Falls, Ont
Horseshoe Falls
Goat Island
American Falls
Niagara Falls, N.Y.
Rainbow Bridge

level at Pointe-au-Pere (Father Point), Quebec, on the International Great Lakes Datum (1955).

Fluctuations of Water Level.–Variations in Lake Erie levels above or below Low Water Datum are reflected in Niagara River levels. The amount of the variation ranges from the full Lake Erie variation at the head of the river and gradually diminishes downstream to the vicinity of Chippawa, Ont., just above Niagara Falls.

From Lake Erie, the fall of the Niagara River is about 10 feet to the head of the upper rapids near the junction with the Welland River. Just below the Welland River entrance, about 1.2 miles E of Goat Island, the Niagara waters begin their rapid descent to the level of Lake Ontario through the rapids above the falls, the great falls themselves, and the rapids below the falls. From the upper rapids, the fall of the river to Lake Ontario is about 316.5 feet.

Currents.–For about 1.7 miles, from its head to just above Peace Bridge, the river is wide, shallow, and rocky, and the current is from 2 to 3 mph. Just above the Peace Bridge, the river becomes a narrow gorge for about 2 miles to the foot of Squaw Island. In the upper part of this gorge, the river is shallow, and the currents are about 8 mph at low to mean river stages and 9 mph at high stages. In the lower part of the gorge, the river is deeper and somewhat wider. Currents just below the International Bridge have velocities of 4 mph at low to mean river stages and 4.75 to 5 mph at high stages. In Tonawanda and Chippawa Channels, the currents vary from 1 to 4 mph.

Channels.–Black Rock Canal is the recommended route from Lake Erie to facilities in the Niagara River below **Squaw Island.** The channel formerly dredged in the open river W of Bird Island and Squaw Island has shoaled to depths of 10 feet or less. The bottom in this reach is generally rocky, and the currents are strong and variable. Great care should be exercised in navigating this section of the river.

A floating timber ice boom is placed across the entrance to the head of the river during the winter. In any one year, construction of the boom will not begin earlier than November 1, with completion not earlier than the first Monday in December. Disassembly of the boom will be accomplished by May 15 in any year.

Black Rock Canal provides a safe passage for large vessels around the rapids and shoals in the head of the Niagara River.

The Lake Erie entrance to Black Rock Canal is through Buffalo Harbor North Entrance Channel and across the Outer Harbor Northern Channel to Black Rock Canal Entrance Channel. From its entrance, the canal leads northward along the Buffalo front, parallel with the river and separated from it by **Bird Island Pier** and Squaw Island. Bird Island Pier and Squaw Island retain the canal pool from the W, and, along with Black Rock Lock, serve to keep the canal level at the same elevation as the water surface of Lake Erie.

From Black Rock Lock at the lower end of Squaw Island, the dredged channel extends to a point about 0.7 mile below **Motor Island,** off the SE side of Grand Island, thence through the natural deep water of Tonawanda Channel. W of **Tonawanda Island,** the dredged channel continues to a turning basin on the N side of Tonawanda Island at North Tonawanda.

From Buffalo North Entrance Channel through Black Rock Canal and Lock to the upper end of Strawberry Island, the Federal project depth is 21 feet. (See Notice to Mariners and latest edition of charts for controlling depths.) In 1971-1974, 21 feet was available in Black Rock Canal from the upper end of Strawberry Island to the end of the dredged section below Motor Island, thence through the natural deep water section of Tonawanda Channel, and thence in the dredged section along the W side of Tonawanda Island to the turning basin except for lesser depths in the lower 100 feet of the basin.

From the downstream end of the turning basin at North Tonawanda, Niagara River Channel leads along the N side of Grand Island to a basin off the public dock at Niagara Falls, N.Y.

Black Rock Canal and the dredged channels leading to the turning basin N of Tonawanda Island are marked by lights, buoys, and lighted ranges.

Passing down the Niagara River from Lake Erie toward Niagara Falls is considered "proceeding from seaward." Buoyage in the river and the Black Rock Canal is based on this convention. Red buoys are on the right-hand side, looking downstream, and black on the left-hand side.

Black Rock Lock connects the canal with the river near the foot of Squaw Island. The lock has a usable length of 625 feet with a clear width of 68 feet and a depth of 21 feet over the sills. The lock has an average lift of 5.2 feet.

Radiotelephone watch on VHF-FM channels 12 (156.60 MHz) and 16 (156.80 MHz) is maintained at station WUD-21, Black Rock Lock. Radio-equipped vessels desiring passage through the lock are requested to contact the lockmaster well in advance of their arrival at the lock in order to eliminate unnecessary delays and facilitate the movement of vessels through the lock.

Effective in 1969, all vessels transiting the Black Rock Canal shall adhere to the following when entering or departing the Black Rock Lock. These controls, including the whistle signal of two long and two short blasts, are in addition to the regulations and information otherwise noted in this Coast Pilot.

1. Maintain only that speed which is necessary to provide sufficient control of the vessel and reasonable headway.
2. Refrain from using bow thruster either in the lock chamber or in the canal from the signal light on the upper E wall to the lower end of the E wall.

Vessels are requested to follow these procedures in order that damage to the operating gates may be prevented.

Lockage for pleasure craft is scheduled downbound on the hour, upbound on the half hours, commercial traffic permitting.

The following signals control the movement of vessels through Black Rock Lock:

For downbound (northbound) traffic, a signal light mounted on a standard on the E approach wall at the entrance to the lock chamber shows green to indicate a clear entrance into the lock chamber. When this signal is red, the downbound vessel will moor at the E approach wall until such time as clear entrance to the lock is indicated by the green light.

For upbound (southbound) traffic approaching the lock from the Niagara River channel, a signal light shows green to indicate a clear entrance to the lock chamber and red to indicate that the lock chamber is closed.

Bird Island is on the W side of the Black Rock Canal about 1.3 miles below the entrance. Piers that enclose the canal extend S from Bird Island and N to connect with Squaw Island. A **special anchorage** is on the N and S sides of Bird Island. (See **33 CFR 110.1 and 110.84,** chapter 2, for limits and regulations.)

Caution.–The canal generally has a slight current downstream. During rapidly rising or high water in Lake Erie, there is a strong crosscurrent at the S end of Bird Island Pier.

Bridges.–Three bridges cross Black Rock Canal. Peace Bridge, 2 miles below the S entrance, has a fixed span with a clearance of 100 feet. An overhead power cable 0.2 mile below the bridge has a clearance of 144 feet. Ferry Street Bridge, 2.6 miles below the entrance, has a bascule span with a clearance of 17 feet for 86 feet from the E abutment, thence decreasing to 12 feet at the W abutment. International Bridge, with a combined rail and highway swing span 3.8 miles below the entrance, has a clearance of 17 feet. (See **33 CFR 117.1 through 117.49,** chapter 2, for drawbridge regulations.)

Regulations.–A **speed limit** of 6 mph (5.2 knots) is enforced in Black Rock Canal. (See **33 CFR 162.175 and 207.590,** chapter 2, for canal regulations.)

The canal has no docks or facilities for mooring large vessels. The Buffalo Yacht Club maintains a small small-craft basin on the canal adjacent to the Buffalo waterworks pumping station. Downstream from the yacht club basin, a berthing area about 12 feet deep has been dredged for the U.S. Naval and Marine Corps Reserve Training Center. Several small-craft facilities are on **Scajaquada Creek,** which enters the canal about 0.5 mile SE of the lock. Transient berths, gasoline, water, electricity, marine supplies, a launching ramp, a 4-ton mobile crane, and hull and gasoline engine repairs are available. In 1977, 4 feet was reported available in the approach and alongside the berths.

Peace Bridge crosses the open Niagara River about 1.5 miles from the head. The bridge has several fixed spans with center clearances of 56 to 91 feet. The normal vessel route is under the fourth span from the U.S. mainland, which has a clearance of 67 feet at the center. An intake crib marked by a light is just downstream of the third span from the U.S. mainland. Navigation through this span is difficult in the turbulent current.

An overhead power cable with a clearance of 126 feet crosses the river 0.2 mile downstream of Peace Bridge.

International Bridge crosses the river about 1.5 miles below Peace Bridge. This railroad bridge has fixed spans with clearances of 22 feet. A swing span at the E end of the bridge, close W of Squaw Island, does not open for the passage of vessels. (See **33 CFR 117.803,** chapter 2, for drawbridge regulations.)

Fort Erie, Ont., is a community on the W side of the head of the Niagara River. A marina is just downstream of the International Bridge; transient berths with electricity, gasoline, diesel fuel, water and a 30-ton hoist are available. A **Canadian Customs port of entry** is at the customs dock just downstream of the public dock. An eddy that tends to force small craft upstream has been reported in the approach to this dock; caution is advised.

Lower Black Rock Harbor is the name applied to the part of Buffalo which fronts on the Niagara River below Black Rock Lock. The harbor is about 0.75 mile long with the upper part between the lock and the mainland. Loaded vessels should use the Black Rock Canal to approach the harbor. Approaching from the open river, the current passing the guide pier below the Black Rock Lock creates a powerful eddy with water flowing upstream along the U.S. side for more than 0.5 mile below the lock. Caution is advised when entering the harbor or docking. The harbor has several marinas. Transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, a launching ramp, mobile lifts to 30 tons, and hull, engine, and electronic repairs are available. In 1977, depths of 7 to 12 feet were reported alongside the berths.

Just below Black Rock Lock, **Strawberry Island** divides the Niagara River into Chippawa Channel and Tonawanda Channel, leading W and E, respectively, of Grand Island. **Chippawa Channel** extends from Strawberry Island for about 11 miles along the SW and W sides of Grand Island to **Navy Island** at the downstream end. The channel leads around either side of Navy Island and joins Niagara River Channel to flow to **Niagara Falls.** In 1982, Chippawa Channel had a reported controlling depth of about 9 feet with shallower depths along the shores. Both sides of Navy Island have good channels but care must be taken to avoid the shoals that extend off the S and NW tips of the island.

Chippawa Channel has several small-craft facilities on both the Grand Island, United States, side of the channel and the mainland Ontario side. Beaver Island State Park Marina is at the S end of Grand Island. Transient berths, water, electricity, and sewage pump-out facilities are available. In 1982, depths of 10 feet were reported in the entrance with 8 feet alongside the berths. Big Six Mile Creek Marina is on the W side of Grand Island about 7.5 miles from the upper end of the channel. Transient berths, gasoline, water, electricity, sewage pump-out facilities, and launching ramps are available. In 1977, depths of 8 feet were reported in the entrance with 6 to 10 feet alongside the berths reported in 1982. A fixed highway bridge and two overhead cables crossing the entrance have a reported least clearance of 16 feet.

The Niagara Parks Commission marina, on the Canadian side of Chippawa Channel opposite Beaver Island State Park, has gasoline, diesel fuel, and sewage pump-out facilities. Depths of 10 feet are reported alongside the marina wharf.

Tonawanda Channel extends from Strawberry Island for about 8.5 miles along the E side of Grand Island to **Tonawanda Island** and the adjoining cities of Tonawanda and North Tonawanda. The dredged and natural channel through this stretch was previously described.

South Grand Island Bridge, crossing the channel about 3.4 miles below Strawberry Island, has twin fixed highway spans with a clearance of 99 feet at the center of the central spans. Vessels requiring the full height should keep at least 90 feet from the face of the piers. Two overhead power cables with a minimum clearance of 115 feet cross the channel about 0.75 mile downstream of the bridge.

Wharves.–Several deep-draft facilities are in Tonawanda Channel on the E side of the river. (For a complete description of the port facilities, refer to Port Series No. 41, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The depths alongside are reported depths. (For latest depths, contact the operators.)

C. R. Huntley, Station Coal Wharf: (42°58'03"N., 78°55'47"W.); 753-foot face; 17 to 21 feet alongside; deck height, 10 feet; open storage for 450,000 tons of coal; rail connections; receipt of coal; owned and operated by Niagara Mohawk Power Corp.

Roblin Industries Wharf: (48°59'00"N., 78°56'30"W.); 1,120-foot face; 1,410 feet with dolphins; 22 feet alongside; deck height, 8 feet; open storage for 20,000 tons of sand; tank storage for 162,000 barrels of asphalt; rail connections; receipt of sand and asphalt; owned by Roblin Industries and operated by various operators.

Newman Fuel Corp. Wharf: about 700 feet S of South Grand Island Bridge; 250 feet of berthing space with dolphins; 22 feet alongside; deck height, 12 feet; storage tank capacity of 774,000 barrels; receipt of petroleum products; owned and operated by R. B. Newman Fuel Corp.

Ashland Oil Wharf: about 0.3 mile NE of South Grand Island Bridge; 330 feet of berthing space with dolphins; 22 feet alongside; deck height, 7 feet; tank storage capacity of 974,000 barrels; receipt and shipment of petroleum products; owned and operated by Ashland Oil, Inc.

Several marinas on both sides of Tonawanda Channel between Strawberry Island and South Grand Island Bridge provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Mobile lifts to 40 tons are available for hull, engine, and electronic repairs. In 1977, depths of 25 feet and less were reported alongside the berths.

Tonawanda Harbor, about 12 miles via Tonawanda Channel below the head of the Niagara River, is the W terminus of the New York State Barge Canal. The harbor comprises the river frontage of **Tonawanda, N.Y., and North Tonawanda, N.Y.; Tonawanda Creek,** which separates the two cities, for about 1,400 feet to the Main-Webster Street Bridge; and all of the waterfront of Tonawanda Island, which lies in the river off the main shore.

The part of Tonawanda Harbor extending S from the North Tonawanda turning basin along the E side of Tonawanda Island has depths of about 15 feet with depths of 12 feet in Tonawanda Creek from the mouth to the highway bridge 0.2 mile about the mouth.

Bridges.–Two bridges cross Tonawanda Harbor from the S part of Tonawanda Island to the mainland. Frederick B. Durkee Memorial Bridge is a fixed highway span with a clearance of 14 feet at the center. A railroad swing bridge just S has a clearance of 10 feet. (See **33 CFR 117.1 through 117.59 and 117.811,** chapter 2, for drawbridge regulations.)

Three bridges cross the lower part of Tonawanda Creek. A railroad swing bridge just above the mouth has a clearance of 9 feet. (See **33 CFR 117.809,** chapter 2, for drawbridge regulations.) The bridge is maintained in the open position. Fixed highway bridges 0.2 and 0.3 mile above the mouth have clearances of 24 and 15 feet, respectively.

A **speed limit** of 5 mph (4.4 knots) is enforced in the harbor and in Tonawanda and Ellicott Creeks within the Tonawanda and North Tonawanda city limits. The **harbormasters** of both communities and the sheriff of Erie County enforce these laws and can be contacted through their respective departments.

Several marinas in the harbor provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and marine supplies. Mobile lifts to 40 tons are available for hull, engine, and electronic repairs. In 1977, depths of 8 to 13 feet were reported alongside the berths.

The **New York State Barge Canal System** is entered through Tonawanda Creek. (The canal system is described in chapter 14.)

Niagara River Channel, a dredged channel, leads from the lower end of the turning basin at North Tonawanda along the N side of Grand Island to a basin off the public dock at Niagara Falls, N.Y. In 1970, the controlling depth in the channel was 11 feet. The channel is marked by buoys.

Cayuga Island, close to the N shore of Niagara River Channel about 5 miles below Tonawanda Island, is separated from the mainland by **Little River,** which outlets at either end of the island. **Cayuga Creek** flows into Little River at about midlength of the island. Little River and Cayuga Creek afford a well-protected harbor for small craft. A dredged channel leads from deep water in Niagara River through the lower entrance to Little River. In 1977, the reported controlling depth was 5 feet. The upper entrance to Little River, marked by a private **344°** range, had a reported controlling depth of 4 feet in 1980. Depths inside are about 4 to 7 feet. A fixed highway bridge with a reported clearance of 10 feet crosses Little River just W of the mouth of Cayuga Creek. An overhead cable with a clearance of 55 feet crosses the river about 0.35 mile W of the bridge. A fixed highway bridge crossing Cayuga Creek just above the mouth has a clearance of 9 feet.

A marina on the N side of the lower entrance to Little River provides gasoline, ice, a launching ramp, a 2-ton lift, and hull and engine repairs.

Buckhorn Island is at the NW end of Grand Island opposite Niagara Falls, N.Y. A two-section permanent flow control dike extends NW from the W end of Buckhorn Island closing off the former Buckhorn Channel. Lights mark the ends of the dikes.

An unmarked **dumping ground** is between the dredged portion of Niagara River Channel and the NE end of Buckhorn Island; caution is advised.

North Grand Island Bridge, a twin fixed highway bridge, crosses the river between Niagara Falls, N.Y., and Buckhorn Island. The vertical clearance is 46 feet through the central spans where Niagara River Channel passes. Two overhead power cables crossing the river about 0.5 and 0.7 mile below the bridge have clearances of 79 and 75 feet, respectively. Cable support towers in the river are marked by lights.

Niagara Falls, N.Y., is on the N shore of the Niagara River at the W end of Niagara River Channel. A public dock on the N side of the dredged basin at Niagara Falls provides 300 feet of berthing space with 4 feet reported alongside in 1977.

Weather.–(See page T-2 for **Niagara Falls climatological table.**)

Niagara Falls is a **customs port of entry.**

SW of Niagara Falls, N.Y., Niagara River Channel and Chippawa Channel join, and the Niagara River, more than 1 mile wide at the junction, flows W for almost 3 miles to the falls. In this stretch above the falls, the river becomes quite shallow with numerous submerged rocks. The deeper water is generally close to the S shore W of Navy Island as far as Chippawa, Ont.

Chippawa, Ont., is on the S shore of the Niagara River about 1.8 miles above Niagara Falls, at the junction with the **Welland River.** At the junction of the two rivers are the intake structures of the Queenston plant of the Ontario Hydro-Electric Power Commission. Because of the intake structures, the flow of the Welland River has been reversed and is now from the Niagara River. Mariners are cautioned that the current in the Niagara River at the entrance to the Welland River is very strong. From the entrance, the power commission has dredged the Welland River to a depth of 30 feet for about 4 miles. Above this point, the controlling depth is about 6 feet.

The United States and Canadian Governments have designated the Niagara River for about 2 miles above the falls a safety zone. (See **33 CFR 165.1 through 165.7, 165.20 through 165.25, and 165.902,** chapter 2, for limits and regulations in U.S. waters.)

Canadian Regulations Respecting Navigation on the Upper Niagara River.–1. These Regulations may be cited as the Upper Niagara River Regulations.

2. In these Regulations,

(a) "Upper Niagara River" means the Canadian Waters of the Niagara River between the crest of Horseshoe Falls at Niagara Falls, Ontario, and the Peace Bridge at Fort Erie, Ontario; and

(b) "vessel" means any ship or boat or any other description of vessel used or designed to be used in navigation.

3. No vessel shall navigate the Upper Niagara River downstream of a straight line joining the end of the breakwater at the mouth of the Welland River to the W side of the mouth of Gill Creek at Niagara Falls, New York, except for the purpose of saving life in an emergency.

4. The Minister of Transport may exempt any vessel from compliance with these Regulations.

5. (1) A person who violates the provisions of section 3, is guilty of an offence and liable on summary conviction to a fine not exceeding five hundred dollars.

(2) A person who

(a) operates any vessel contrary to the provisions of section 3;

(b) is a party to any act described in paragraph (a); or

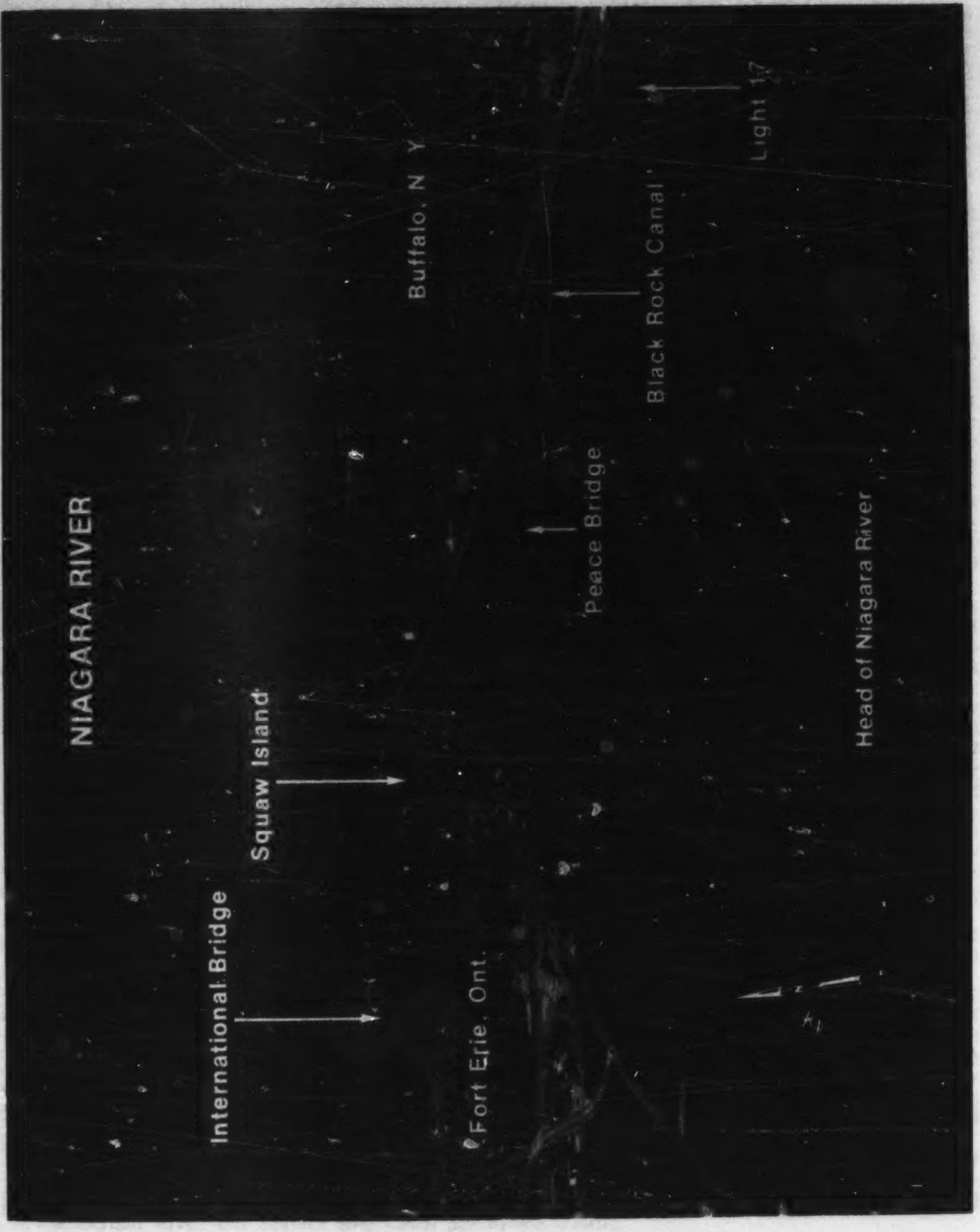
(c) is the owner, charterer, hirer, master or person in charge of a vessel that is operated contrary to the provisions of section 3 shall be deemed to have violated those provisions unless, in any prosecution for such violation, he establishes that the act in respect of which the prosecution has been commenced took place without his consent and that he exercised all due diligence to prevent its commission.

Charts 14822, 14832, 14833.–**Buffalo Harbor** is at the E end of Lake Erie, where the lake converges to an open and comparatively shallow bay about 8 miles across N and S and is subject to great storms from the SW. The lake discharges into the Niagara River at the NE corner of this bay. The city of **Buffalo, N.Y.,** is along the E lakeshore and the E bank of the head of the Niagara River. **Buffalo River** meanders through the city from E to W and enters the lake near the head of the Niagara River.

Waterborne commerce at the port is in iron ore, limestone, iron and steel products, petroleum and coal products, grain, sand, tar, cement, salt, other minerals, and general and containerized cargo in the foreign and domestic trades.

Prominent features.–The stacks of Bethlehem Steel Corp. at Lackawanna near the S end of the harbor are the most conspicuous objects when approaching Buffalo Harbor. Also prominent are the Marine Midland Center and the City Hall tower in downtown Buffalo.

Buffalo Harbor Light (42°52.2'N., 78°54.2'W.), 71 feet above the water, is shown from a white tower on a concrete base on the S end of the detached W breakwater on the N side of Buffalo Harbor North


NIAGARA RIVER
International Bridge
Squaw Island
Buffalo, N Y
Fort Erie, Ont.
Peace Bridge
Black Rock Canal
Light 17
Head of Niagara River

BUFFALO, N.Y.
Marine Midland Center
Buffalo River
Coast Guard Base
South Side Light
North Entrance Channel
North Side Light
Lake Erie
North Breakwater, South End Light
Erie Basin

[illegible]

Entrance Channel. A radiobeacon and fog signal are at the light.

Channels.–A Federal project provides for an outer harbor formed by breakwaters parallel with the shore and an inner harbor comprising the Buffalo River and the Buffalo Ship Canal.

Buffalo Outer Harbor has entrances at the N and S ends. From deep water in Lake Erie, **Buffalo Harbor North Entrance Channel,** marked by lights on the ends of the breakwaters and lighted buoys, extends NE into Outer Harbor and thence into two waterways, Black Rock Canal and Buffalo River. Federal project depth in the channel is 25 feet. There is a strong N current across this channel; navigators should guard against this by holding up toward the S. **Buffalo Harbor South Entrance Channel,** marked by lights on the ends of the breakwaters, extends SE from deep water in the lake to Outer Harbor and thence into two canals, Union Canal and Lackawanna Canal. A radiobeacon is at the light on the inner end of the south breakwater. Federal project depth in the channel is 30-29 feet. (See Notice to Mariners and latest edition of charts for controlling depths.)

Buffalo Outer Harbor provides a safe harbor of refuge and anchorage and is also used extensively by large lake vessels as a channel. Vessels seeking anchorage and small vessels passing along the breakwaters are cautioned against approaching them nearer than 100 feet in order to avoid striking the stone riprap. Federal project depths in Outer Harbor are 23 feet in Northern Channel, 27 feet in Middle Channel, 28 feet in Southern Channel, and 23 feet in the turning basin. The turning basin is marked by buoys. (See Notice to Mariners and latest edition of charts for controlling depths.)

Lackawanna Canal, extends S for 0.75 mile from the S end of Outer Harbor. In entrance is mrked by private lights. In 1973, the controlling depth was 25 feet with 24 feet along the dock on the W side and shoaling to 22 feet at the S end.

Union Canal, marked at the entrance by a buoy and a private light, extends E for about 0.8 mile from the S end of Outer Harbor. In 1973, the midchannel controlling depth was 20 feet.

Buffalo Inner Harbor comprises Buffalo River and Buffalo Ship Canal. The dredged section of **Buffalo River** extends SE and then generally E for about 5.8 miles from the N end of Outer Harbor to the ConRail railroad bridge. Federal project depth is 22 feet. However, the river is subject to extensive shoaling. The entrance to the river is marked by lights and buoys. (See Notice to Mariners and latest edition of charts for controlling depths.) Above the ConRail bridge, depths are 5 to 15 feet to the mouth of **Cazenovia Creek** and thence 1 to 6 feet to the Bailey Avenue Bridge. Submerged rocks immediately above Bailey Avenue Bridge render navigation for even small craft very hazardous.

From about 1,000 feet downstream of the junction of the Buffalo River and Buffalo Ship Canal upstream for about 1 mile, the river bottom is soft clay and mud overlying rock to a depth ranging from 1 to several feet. Vessels grounding in this portion of the river are seldom damaged by contact with the bottom. Above this point for about 1 mile, the channel is cut through solid rock.

Buffalo Ship Canal extends SE for about 1.4 miles from the inner end of Buffalo River Entrance Channel. The Federal project depth is 22 feet for about 1 mile. (See Notice to Mariners and latest edition of charts for controlling depths.)

Black Rock Canal Entrance Channel, marked by lights and buoys, extends N from the N end of Outer Harbor. Federal project depth is 21 feet. (See Notice to Mariners and latest edition of charts for controlling depths.) **Black Rock Canal** is the navigable channel of the upper Niagara River as far N as **Tonawanda** and is discussed more fully under Niagara River. The Lake Erie W terminus of the Erie branch of the **New York State Barge Canal System** is at Tonawanda.

Anchorages.–The Outer Harbor is all good anchorage ground, except that the bottom is very soft clay S of the middle gap of the breakwaters. There are about 22 large mooring rings on the breakwater adjoining the North Entrance Channel and 25 on the breakwater adjoining the South Entrance Channel. Vessels are permitted to moor to the breakwaters with manila or synthetic lines, but not with wire rope or chains. Vessels are requested not to anchor N of Berthing Area 11. Vessels not longer than 550 feet will be permitted to anchor in Berthing Areas 11 through 17. However, no anchorage will be permitted in Berthing Areas 11 through 24 until vessel traffic to the Niagara Frontier Transportation Authority pier at the foot of Michigan Avenue has ended for the navigation season, and then only by permission from the District Engineer, U.S. Army Corps of Engineers, Buffalo, N.Y. Anchorage will be permitted in berthing areas S of Berthing Area 24 with no restrictions as to length of vessel. The berthing areas are all marked by large orange numbers painted on the harbor face of the breakwaters.

Explosives anchorages are in Outer Harbor Middle Channel and on the S side of South Entrance Channel. (See **33 CFR 110.1 and 110.208,** chapter 2, for limits and regulations.)

A special anchorage is in the small-craft basin on the E side of Outer Harbor. (See **33 CFR 110.1 and 110.84b,** chapter 2, for limits and regulations.)

Dangers.–Numerous unmarked detached shoal spots with depths less than 30 feet are in the E end of Lake Erie, in the approaches to Buffalo Harbor and the Niagara River. **Waverly Shoal,** with a least depth of 10 feet, is 1.9 miles WSW of Buffalo Harbor Light. A buoy marks the S side of the shoalest part, and depths of 18 feet extend about 0.4 mile N and 0.9 mile S from the buoy.

Unmarked 20-foot shoals are 1.4 and 2.6 miles SW of Buffalo Harbor Light.

Local bridge regulations.–Sec. 305. Bridge Control and Traffic.

(2) Whenever, between 6:30 a.m. and 8 p.m., at movable bridges over any portion of the harbor, persons, teams, or vehicles have been delayed at said

Structures across the Buffalo Waterways

**Miles above North Breakwater South End Light*
***Clear width in feet proceeding upstream*

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
	Buffalo River							
	Junction with Buffalo Ship Canal		0.97					
1	Buffalo Skyway Bridge	Highway	1.00			215	100	Fixed.
2	Michigan Ave. bridge	Highway	1.34			177	20	Vertical lift. Clearance up 101 feet. Note 1.
3	Ohio St. bridge	Highway	2.10			251	18	Vertical lift. Clearance up 105 feet. Note 1.
4	Overhead cable	Power	3.40				133	
5	ConRail bridge	Railroad	4.02			100	18	Bascule. Note 1.
6	ConRail bridge	Railroad	4.39			97	12	Bascule. Note 1.
7	Buffalo Creek RR bridge	Railroad	4.39			97	12	Bascule.
8	ConRail bridge	Railroad	5.07			112	36	Bascule.
9	South Park Ave. bridge	Highway	5.22			200	19	Vertical lift. Clearance up 95 feet. Notes 1 and 2.
10	ConRail bridge	Railroad	5.79			104	25	Bascule. Note 3.
	Junction with Cazenovia Creek		6.09					
11	Bailey Ave. bridge	Highway	6.24			91	17	Bascule.
	Cazenovia Creek							
12	Overhead cable	Power	6.19					Data not available.
13	Bailey Ave. bridge	Highway	6.22				12	Fixed.
	Buffalo Ship Canal							
14	Buffalo Skyway Bridge	Highway	1.10			193	100	Fixed.
	Union Canal							
16	Fuhrmann Blvd. bridge	Highway	0.68			80	9	Bascule. Note 4.
17	Father Baker Memorial Bridge	Highway	0.70			200	105	Fixed. Note 4.

See 33 CFR 117.1 through 117.49, chapter 2, for drawbridge regulations.

Note 1.–See 33 CFR 117.1 through 117.59 and 117.773, chapter 2, for drawbridge regulations.

Note 2.–Clear height when raised is 95 feet at left channel limit increasing to 100 feet 25 feet channelward of right channel limit and 100 feet at right channel limit. Clear height when closed is 19 feet at left channel limit and 20 feet at right channel limit with an increased height of 21 feet over a width of 140 feet 50 feet channelward of the left channel limit and extending within 10 feet of the right channel limit.

Note 3.–Not operated until channel above bridge is opened to traffic.

Note 4.–Mileage is above South Buffalo North Side Light.

bridge 10 minutes by reason of any such bridge being open for a vessel to pass, it shall be the duty of the bridgetender or other persons in charge thereof to give said signals and immediately close said bridge and keep it closed 10 minutes for such persons, teams, or vehicles to pass, if so much time shall be required, when said bridge shall be opened again and kept open for a like period, if necessary, for vessels to pass, and so on, alternately, if necessary, during the hours aforesaid.

Sec. 307. Time to Remain Open.–Whenever any person having charge of any vessel shall wish to move the same past any bridge over any portion of the harbor, reasonable time shall be allowed for opening the same.

Sec. 308. Fire and Police Vehicles-Right of Way.–Whenever at any alarm of fire any fire engine, hose cart, or other fire apparatus shall approach any bridge over the harbor, for the purpose of crossing the same toward such fire, the bridgetender shall, if such bridge is open, close the same as soon as practicable and keep it closed until such fire apparatus shall have had an opportunity to pass over said bridge, notwithstanding vessels may be delayed thereby. All vehicles of the fire department and the police department and vessels operated by either of said departments, shall have the right of way across or through any such bridge over all other traffic.

Sec. 309. Vessel Signals.–It shall be unlawful for the owner, officer, or other person in charge of any vessel to attempt to pass any movable bridge across the harbor while a stop signal is being given or displayed.

The commissioner of public works shall provide and maintain signals at the public highway bridges over the harbor, as required by the U.S. Commissioner of Lighthouses, for the security of navigation.

The owner of any movable bridge over the harbor shall provide and maintain vessel signals, as required by the Commissioner of Lighthouses, or by ordinances of the city of Buffalo, for the security of navigation. During closed seasons of navigation, lights on bridges over the harbor and other structures in the harbor must be exhibited from sunset to sunrise at all times when vessels can enter port or are navigating in the vicinity.

Sec. 310. Railroad Bridges.–For all bascule or swing bridges over any portion of the harbor not carrying highway traffic, when any vessel shall signal for its opening, the bridgetender shall immediately open the bridge, unless a train be on the bridge or approaching it so closely as to be unable to stop, and in that case the bridge shall be kept closed long enough for the passage of one train and no more.

Sec. 312. Steamboat Whistles.–No person, firm, or corporation shall blow or cause to be blown the steam whistle of any vessel, for any purpose whatever, while lying at any wharf or dock in the city of Buffalo, or when approaching or leaving such wharf or dock, or when passing through any drawbridge over the harbor, or when running in the harbor, except when necessary as a signal of danger and in cases and under circumstances prescribed by the laws and regulations of the United States and by the ordinances of the city of Buffalo.

No captain or person in charge of a vessel in the Buffalo harbor shall permit any whistle upon such vessel to be blown except for the purpose of giving and answering signals; and no "four whistles" shall be answered by any vessel while lying at the dock.

Fluctuations of water level.–The water level of Lake Erie at Buffalo is frequently affected, usually for periods of less than 12 hours, by strong SW or NE winds. It is reported that these winds may raise or lower water levels by as much as 6 feet. The record fluctuations recorded are 10½ feet above and 4½ feet below Low Water Datum.

The records of the monthly mean stages at Buffalo show that the periods of lowest water during the navigation season are in the spring and fall, the latter being the busiest time of the year in the harbor, when the necessity for deep water is greatest.

Water level information for the Buffalo area may be obtained by contacting Buffalo Coast Guard Group on VHF-FM channel 16 (156.80 MHz). The information is given in whole inches above or below chart datum.

Currents.–There is very little current in the outer harbor except during sudden fluctuations of water level, which may cause considerable current, especially in the entrance channels.

The currents in the river are reported to reach velocities of 3 to 5 mph, changing direction and velocity abreast Buffalo Ship Canal. Rapid fluctuations in Lake Erie produce quite strong currents in the river within 1 mile of the mouth, inflowing or outflowing as the case may be. Heavy rainfalls and spring freshets are attended by strong outflowing currents due to rapid rises of the river and the consequent discharge of flood water. These conditions cause difficulties to navigation and sometimes damage to vessels by tearing them from their moorings, but occur only two or three times each year and for only a few hours at a time. With heavy rainfalls, it is reported that currents in the river sometimes reach velocities of 6 to 10 knots.

Weather.–(See page T-3 for **Buffalo climatological table.**)

Ice.–Heavy ice forms in the river, usually in January. A narrow channel is kept open through the ice by tugs, but the ice remains in place because the E end of Lake Erie also freezes over, and the harbor entrance is usually blocked with ice from January to March or April. The ice usually goes out in the spring during a freshet in the river, and the combined effect of the then prevailing strong outflowing currents and the heavy moving ice is at times very great and may last for 2 or 3 days. During this time, the liability of damage to vessels is considerable.

Heavy ice forms in the Buffalo Ship Canal in winter, usually in January. A narrow channel is kept open through the ice by tugs, but the ice remains in place, the same as in the Buffalo River. The ice drifts out on the opening of the entrance channel in March or April, or melts in place, and its breaking up in the spring is not attended with the same liability to damage as in the case of the Buffalo River.

Towage.–Tugs to 1,250 hp are available at Buffalo. Arrangements for tugs are made through the Great Lakes Towing Co. dispatcher in Cleveland at 800-321-3663 or on VHF-FM channels 16 (156.80 MHz), 10 (156.50 MHz), 12 (156.60 MHz), and 18A (156.90 MHz) via remote antenna. The tugs' VHF-FM channels include 16, 6 (156.30 MHz), 12, 14 (156.70

MHz), and 18A. At least 2 hours advance notice is requested. City regulations require that all vessels which require the opening of one or more bridges while navigating in the Buffalo River must have the assistance of one or more tugs when approaching and passing these bridges. Vessels navigating stern first are required to have a tug on the stern and a tug on the bow.

Buffalo is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard.–A **Marine Safety Office** is in Buffalo. (See appendix for address.) Buffalo Coast Guard Station and Group Office are on the S side of the entrance to the Buffalo River.

Harbor regulations.–A **speed limit** of 6 mph (5.2 knots) is enforced in Buffalo Harbor except in the Outer Harbor where the speed limit is 10 mph (8.7 knots). (See **33 CFR 162.165 and 207.580,** chapter 2, for regulations.)

Local harbor regulations are established by the Corporation Counsel and enforced by the **harbormaster,** who may be reached at City Hall. Vessels shall not approach or pass any movable bridge at a speed exceeding 3 mph (2.6 knots). Copies of the regulations may be obtained from the Corporation Counsel, City Hall, Niagara Square, Buffalo, N.Y. 14202.

Wharves.–Buffalo has more than 60 piers and wharves in the Outer Harbor, the Buffalo River, and the Lackawanna, Union, and Buffalo Ship Canals. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 41, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities decribed are reported depths. (For information on the latest depths, contact the operators.) All of the facilities have direct highway connections, and most have rail connections. Water is available at many of the piers and wharves. General cargo at the port is usually handled by ship's tackle.

Facilities in Lackawanna Canal:

Bethlehem Steel Corp., Steel Dock: W side of Lackawanna Canal; 3,900-foot face; 27 feet alongside; deck height, 7½ feet outer section, 12½ feet inner section; open storage for 20,000 tons of limestone; seven storage tanks, 362,000-barrel capacity; three 20-ton gantry cranes; receipt of limestone and fuel oil; shipment of steel mill products; owned and operated by Bethlehem Steel Corp.

Bethlehem Steel Corp., Ore Dock: E side of Lackawanna Canal; 3,975-foot face; 27 feet alongside; deck height, 12½ feet; four 17-ton hulett-type ore unloaders, unloading rate 650 tons per hour each; three traveling bridge cranes; four traveling hoppers which serve belt conveyor system; open storage for over 2 million tons iron ore, 250,000 tons limestone, 400,000 tons dolomite, and 1 million tons coal; receipt of iron ore, iron pellets, and limestone; owned and operated by Bethlehem Steel Corp.

Facilities in Union Canal:

Bethlehem Steel Corp., Union Canal Dock: S side of Union Canal W of highway bridge; 778 feet of berthing space; 20 feet alongside; deck height, 10½ feet; open storage for 400,000 tons of limestone or dolomite; receipt of limestone and dolomite; owned and operated by Bethlehem Steel Corp.

Hanna Furnace Corp., South Dock: S side of Union Canal E of highway bridge; 2,235-foot face; 21 feet alongside; deck height, 10 feet; three traveling bridge cranes, operating rate about 225 tons per hour each; 490,000 square feet open storage; receipt of iron ore and limestone, shipment of pig iron; owned by National Steel Corp. and operated by Hanna Furnace Corp.

Hanna Furnace Corp., North Dock: N side of Union Canal E of highway bridge; 1,635 feet of berthing space; 22 feet alongside; deck height, 12 feet; 270,000 feet of open storage; receipt of limestone and iron ore, shipment of pig iron; owned by National Steel Corp. and operated by Hanna Furnace Corp.

Independent Cement Co. Wharf: N side of Union Canal W of highway bridge; 634 feet of berthing space; 22 feet alongside; deck height, 8 feet; belt conveyor serves storage silos with 100,000-ton capacity; open storage for 30,000 tons of slag; receipt of cement; shipment of slag; owned and operated by St. Lawrence Cement Co., subsidiary of Independent Cement Co.

Facilities in the Outer Harbor:

Niagara Frontier Transportation Authority, Terminal A: (42°51'14"N., 78°52'19"W.); 650-foot face, 27 feet alongside; S side 1,000 feet long, 27 feet alongside; deck height, 12 feet; 55-ton gantry crane, and one 25-ton crawler crane; 83,000 square feet covered storage; 172 acres open storage; receipt and shipment of general cargo; owned by Niagara Frontier Transportation Authority and operated by Marine Intercontinental Terminals of Buffalo, Inc.

Niagara Frontier Transporation Authority, Terminal B: adjacent N of the face of Terminal A; 750-foot face; 23 to 27 feet alongside; deck height, 12 feet; 83,000 square feet covered storage; 1½ acres open storage; receipt and shipment of general cargo; owned by Niagara Frontier Transportation Authority and operated by Marine Intercontinental Terminals of Buffalo, Inc.

Niagara Frontier Transportation Authority, Seaway Pier No. 2: (42°52'05"N., 78°52'52"W.); 1,179-foot north side; 23 to 25 feet alongside; deck height, 12 feet; two bulk material storage sheds; receipt and shipment of bulk commodities including sand, potash, salt, gypsum rock, china clay, limestone, and tallow; owned by Niagara Frontier Transportation Authority and operated by Marine Materials Handling Co., Inc.

Niagara Frontier Transportation Authority, Seaway Pier No. 1: (42°52'09"N., 78°52'57"W.); 200-foot face, 27 feet alongside; S side 1,187 feet long, 24 feet alongside; N side 1,168 feet long, 24 feet alongside;

deck height, 12 feet; belt conveyor serving vessel-loading spout; open storage for 50,000 tons of coke; shipment of coke; owned by Niagara Frontier Transportation Authority and operated by Mid-Continent Coal and Coke Co.

International Salt Co. Pier: (42°52'13"N., 78°53'00"W.); 800-foot face; 17 feet alongside; deck height, 8 feet; open storage for 65,000 tons of salt; receipt of salt; owned and operated by International Salt Co., Inc.

Facilities in Buffalo Ship Canal:

Sand Products Landing: W side of canal about 1 mile above the entrance; 1,000-foot face; 13 to 20 feet alongside; deck height, 8 feet; open storage for 50,000 tons of sand; storage silo; receipt of sand; owned by Consolidated Rail Corp. and operated by Sand Products Corp.

Pillsbury Mutual Wharf: E side of canal about 0.6 mile above the entrance; 1,520 feet of berthing space; 21 to 27 feet alongside; deck height, 8 feet; two traveling unloading towers, 10,000-bushel-per-hour capacity each; one loading tower, 11,000-bushel-per-hour capacity; receipt and shipment of grain; owned and operated by The Pillsbury Co.

General Mills Wharf: E side of canal about 0.2 mile above the entrance; 1,025-foot face plus 700 feet of rock-revetted natural bank; 22 feet alongside; deck height, 8 feet; two marine legs, 25,000-bushel-per-hour unloading rate each; 4-million-bushel grain elevator; receipt of grain; owned and operated by General Mills, Inc.

Facilities in the Buffalo River:

Huron Cement Co. Upper Wharf: S side of river below Ohio Street Bridge; 475-foot face; 20 to 22 feet alongside; deck height, 10 feet; two unloading hoses extend to cement storage silos with 21,000-ton capacity; receipt of cement; owned and operated by Huron Cement Co., Division of National Gypsum Co.

Peavey Co. Wharf: S side of river 800 feet above Ohio Street Bridge; 578-foot face; 24 feet alongside; deck height, 8 feet; two unloading towers, 25,000-bushel-per-hour capacity; two loading spouts, 17,000-bushel-per-hour capacity; 3¼-million-bushel grain elevator; receipt and shipment of grain, shipment of bulk and bagged flour; owned and operated by Peavey Co.

Standard Elevator Wharf: N side of river above Ohio Street Bridge; 875-foot lower face, 19 to 22 feet alongside; 388-foot upper face, 16 to 20 feet alongside; deck height, 8 feet; two traveling unloading towers, 15,000-bushel-per-hour capacity; loading spout, 20,000-bushel-per-hour capacity; 5-million-bushel grain elevator; receipt and shipment of grain; owned by Standard Milling Co. and operated by Standard Elevator and Grain Division of Standard Milling Co.

Lake and Rail Elevator Wharf: S side of river about 1,000 feet above the Peavey Co. Wharf; 535 feet of berthing space E face, 20 to 24 feet alongside; deck height, 10 feet; two traveling unloading towers, 12,500-bushel-per-hour capacity each; loading spout, 35,000-bushel-per-hour capacity; 4½-million-bushel grain elevator; receipt of grain; owned and operated by International Multifoods Corp.

Williams Paving Co. Wharf: N side of river about 0.4 mile above Ohio Street Bridge; 750-foot face; 15 to 18 feet alongside; deck height, 8 feet; open storage for 12,000 tons of material; receipt of sand and limestone; owned and operated by Williams Paving Co., Division of Greater Buffalo Press, Inc.

Republic Steel Corp., Steel Loading Wharf: S side of river about 0.5 mile below South Park Avenue Bridge; 600-foot face; 20 feet alongside; deck height, 12 feet; two 10-ton gantry cranes; 200,000-gallon storage tanks for liquid coke by-products; ½ acre open storage; shipment of steel bars, billets, ingots, and liquid coke by-products; owned and operated by Republic Steel Corp., Buffalo District.

Republic Steel Corp., Ore and Limestone Dock: S side of river immediately above Steel Loading Wharf; 1,188-foot face; 21 feet alongside; deck height, 15 feet; two traveling bridge cranes, 400-ton-per-hour unloading rate; open storage for 600,000 tons of iron ore and limestone; receipt of iron ore and limestone; owned and operated by Republic Steel Corp., Buffalo District.

Republic Steel Corp., Oil Wharf: S side of river about 0.3 mile above South Park Avenue Bridge; 237-foot and 323-foot bulkheads separated by 237 feet of natural bank; 16 feet alongside; deck height, 8 feet; pipelines to oil storage tanks; receipt of fuel oil; owned and operated by Republic Steel Corp., Buffalo District.

Mobil Oil Corp., Bulk Terminal: N side of river about 0.4 mile above South Park Avenue Bridge; 1,470-foot face; 15 to 22 feet alongside; deck height, 12 feet; pipelines to oil storage tanks; receipt of petroleum products, fueling of small vessels; owned and operated by Mobil Oil Corp.

Supplies.–Water, provisions, and marine supplies are available at Buffalo. Bunker fuel and diesel fuel are delivered to vessels at their berths by tank vessels. Arrangements should be made through ships' agents. Occasionally tank trucks supply vessels with bunker fuel.

Foreign-Trade Zone No. 23 is in Buffalo. (See chapter 1, Foreign-Trade Zones, and appendix for address.)

Repairs.–There are no facilities for drydocking or hauling out large, deep-draft vessels. Two companies that have no waterfront facilities maintain shops and portable equipment for making above-the-waterline repairs and for installing equipment and machinery.

Small-craft facilities.–**Erie Basin,** close N of the mouth of the Buffalo River, is the site of the city's marina. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, a launching ramp, and minor engine repairs are available. In 1977, depths of 20 feet were reported in the entrance channel and alongside the berths, with 17 feet alongside the gasoline dock. The Buffalo **harbormaster** maintains an office in Erie Basin; telephone, 716–842–0452.

The Niagara Frontier Transportation Authority operates a small-craft basin on the E side of Buffalo Outer Harbor about 2.3 miles SE of the mouth of Buffalo River. Transient berths, gasoline, water, ice, electricity, marine supplies, a launching ramp, a 22-ton mobile lift, and hull, engine, and electronic repairs are available. In 1977, depths of 7 feet were reported in the entrance with 3 to 14 feet alongside the berths.

Measured course.–A measured mile, statute and nautical, is marked on the E face of the breakwater at the N end of the Outer Harbor.

Communications.–Buffalo has excellent rail and highway connections with major United States and Canadian cities. Greater Buffalo International Airport is 8 miles ENE of the city.

Chart 14822.–From **Stony Point** at the S end of Buffalo Harbor, the shoreline trends S for about 3.5 miles and is obstructed by shallow patches extending 1 mile offshore.

A diked disposal area on the W side of Stony Point begins at South Buffalo Pierhead Light and curves SW to a point on shore about 0.5 mile S. The N end of the dike is marked by a light.

S of the disposal area, a **dumping ground** extends about 0.5 mile from the shoreline for about 1 mile. A least depth of 6 feet was reported in 1977.

About 3.5 miles S of Stony Point, the shoreline turns SW and continues this trend, with some southerly recessions and slight irregularities, for about 210 miles to a point about 3 miles E of Huron, Ohio, the southernmost point on the lake. The hydrography along this entire reach is generally of a uniform character, with no shoals, other than Seneca Shoal, at any great distance offshore, and the land varies from a low character to moderate bluffs of 60 to 120 feet high. The usual routes between ports are well out in deep water, and there are no natural obstacles which make navigation especially hazardous. From the bend S of Stony Point for the first stretch of 12 miles to Sturgeon Point, there are a number of submerged and exposed cribs as much as 0.6 mile offshore.

Seneca Shoal, about 4.4 miles SW of Stony Point, has a least depth of 12 feet and is marked on its NW edge by a lighted buoy.

Chart 14823.–Between **Sturgeon Point** (42°41.4'N., 79°02.9'W.) and **Silver Creek,** about 12 miles SW, the hydrography is less regular. W of **Big Sister Creek,** about 2 miles from Sturgeon Point, an unmarked boulder ledge with a least depth of 3 feet extends 2 miles offshore.

Cattaraugus Creek is about 9.5 miles SW of Sturgeon Point. A straight, narrow, privately marked channel leads into the creek. In 1982, breakwaters were under construction on the N and S sides of the entrance. The ends of the breakwaters are marked by lights. In 1977, it was reported that the creek offers good protection from all but strong SW winds. It was also reported that the controlling depth varies from 2½ to 5 feet, depending on the shifting shoals. Local knowledge is advised. Several marinas in the creek provide transient berths, gasoline, water, electricity, marine supplies, and launching ramps. Mobile lifts to 6 tons are available for hull and minor engine repairs. In 1977, depths of 2 to 10 feet were reported alongside the berths.

Between Cattaraugus Creek and Silver Creek, a stony ledge extends 1.5 miles from shore. From Silver Creek, the shoreline trends generally SW for 10 miles to Dunkirk, and shoal water extends about 0.8 mile offshore.

Dunkirk Harbor, about 35 miles SW of Buffalo Harbor, is in an indentation of the shore between **Battery Point** on the E and **Point Gratiot** on the W. The harbor serves the town of **Dunkirk, N.Y.**

An unmarked **dumping ground** with a least reported depth of 35 feet is 1 mile NE of Point Gratiot.

Dunkirk Light (42°29.6'N., 79°21.2'W.), 82 feet above the water, is shown from a white square tower with an attached dwelling on Point Gratiot.

Channels.–The harbor is entered from Lake Erie through a dredged entrance channel NE of Point Gratiot. The channel leads SE between a pier on the W and a detached breakwater on the E to the harbor basin off the city dock. The pier and breakwater are marked on the outer ends by lights, and the channel limits are marked by buoys. In August 1984, the controlling depth was 6 feet (9½ feet at midchannel) from deep water in the lake through the entrance channel to the city dock. E of the city dock, N of the E breakwater, the channel had a controlling depth of 2 feet except for shoaling along the edges. Two detached breakwaters extend E and W from the N end of the city dock. The ends of the breakwaters are marked by lights. In 1983-August 1984, the controlling depth was 6½ feet except for shoaling to bare at the S end in the channel along the E side of the city dock; thence in August 1984, 2½ feet except for shoaling at the E end in the channel behind the E breakwater and 2½ feet except for shoaling to bare along the S edge in the channel behind the W breakwater. The channels are marked by lights and buoys.

Anchorages.–Because of the rock bottom, anchorage in the harbor is poor. The shallow water does not permit mooring to the breakwater.

Dangers.–Vessels entering the harbor should hold to the E to avoid the shoals along the SW side of the channel. As there is no breakwater protection on the E side, the harbor is subject to severe wave action from E storms.

Small-craft facilities.–In 1977, the **harbormaster** reported that the Dunkirk Public Dock at the foot of Central Avenue was in an unsafe condition and was no longer being used by commercial vessels. Persons desiring to load or unload cargo at the dock should contact the harbormaster or the city engineer for additional information. The dock has water and electricity available for transient small craft. In 1977, depths of 5 to 8 feet were reported along the N end of the E face.

Small-craft facilities SW of the city dock provide gasoline, diesel fuel, water, sewage pump-out, marine supplies, and a launching ramp. Mobile lifts to

1½ tons are available for emergency hull and minor engine repairs.

Between Gratiot Point and **Van Buren Point** (42°27.2'N., 79°25.0'W.), 4.3 miles SW, a rocky bank with less than 20 feet of water extends 1 mile from shore. From Van Buren Point, the shoreline trends SW for about 12 miles to Barcelona Harbor. The shore is clear to within 0.7 mile except just W of Van Buren Point where depths to 19 feet extend 1.2 miles off.

Barcelona Harbor, just E of the mouth of **Chautauqua Creek,** is about 17 miles SW of Dunkirk. Although it is not protected from E winds or strong winds from any direction, it is sometimes used as a harbor of refuge by light-draft vessels. A large white building with a red roof is prominent on the W side of the harbor entrance.

Channels.–The harbor is entered from Lake Erie through a dredged entrance channel between two converging breakwaters to a harbor basin just inside. Lights mark the outer ends of the breakwaters. In August 1984, the controlling depths were 5½ feet (10 feet at midchannel) in the entrance channel, thence 7 to 8 feet in the basin with lesser depths along the edges.

Small-craft facilities.–An unmarked channel leads from the harbor basin SE to the city dock. In 1977, depths of 4 feet were reported in the channel and along the N 200 feet of the W face of the dock. A marina on the SW side of the harbor provides transient berths, gasoline, diesel fuel, water, ice, electricity, and marine supplies. Mobile lifts to 9 tons are available for hull and gasoline engine repairs. In 1977, depths of 4 feet were reported alongside the berths.

Charts 14823, 14824, 14828.–Erie Harbor is about 28 miles SW of Barcelona. The intermediate shore has no shoals beyond a distance of about 0.7 mile. The **State boundary** between New York and Pennsylvania is about 10 miles SW of Barcelona.

Charts 14824, 14828, 14835.–Presque Isle (42°10.4'N., 80°04.8'W.) is an irregularly shaped peninsula forming nearly landlocked Erie Harbor. The peninsula is connected to the mainland by a narrow neck at the W end and broadens as it curves around to the NE and E. The entrance to Erie Harbor is on the S side of the E end of the peninsula. Presque Isle State Park is on the peninsula. **Presque Isle Light** (42°09.9'N., 80°06.9'W.), 73 feet above the water, is shown from a white square tower with an attached red dwelling on the NW shore of the peninsula. Numerous shore protection structures extend lakeward from the lakeside of the peninsula. Small-craft operators are cautioned to keep 500 feet offshore in the vicinity of these structures.

Erie Harbor, about 78 miles SW of Buffalo, is in **Presque Isle Bay,** enclosed from the lake by Presque Isle. The bay opens to the E and is about 4.5 miles long and 1.5 miles wide. Erie Harbor, serving the city of **Erie, Pa.,** is in the SE part of the bay.

Principal commerce at the port is in limestone, sand, salt, petroleum products, coke, steel products, pig iron, other alloys, gravel, clay, and general cargo in the domestic trade.

Prominent features.–The stacks at the paper plant 1 mile SE of Erie Harbor Pierhead Light and the lighted stack 2.2 miles ESE of the light are prominent.

Erie Harbor Pierhead Light (42°09.4'N., 80°04.3'W.), 42 feet above the water, is shown from a black and white horizontally banded square tower on the outer end of the N entrance pier. A fog signal and radiobeacon are at the light.

Channels.–A Federal project provides for a dredged entrance channel leading SW from deep water in Lake Erie between two parallel piers to a harbor basin and three adjacent turning basins in Presque Isle Bay. The N pier is marked by a light at its outer end, and the S pier by two lights near its midlength which form a **235°** range. The channel limits are marked by lighted and unlighted buoys. Two lights near the inner end of the N pier form a **054°30'** range. The Federal project depths are 29 feet in the entrance channel, 28 feet in Harbor Basin, 27 feet in Approach Turning Basin, 21 feet in Erie Turning Basin, and 18 feet in Harbor Turning Basin. (See Notice to Mariners and latest edition of charts for controlling depths.) **Erie Harbor Directional Light** (42°08.4'N., 80°05.3'W.), shown from the outer end of the Continental Grain Co. pier on the S side of the basin, shows a green sector over the deeper water of Harbor Basin and Approach Turning Basin, and a red sector over the shallower water of Erie Turning Basin.

An approach channel marked by buoys leads SW from the harbor basin to a turning basin off the piers on the S side of the bay about 2.6 miles SW of Erie Harbor Pierhead Light. The channel and turning basin are not maintained.

Misery Bay is an indentation in the S side of Presque Isle N of Erie Harbor Entrance Channel. The bay has depths of 5 to 10 feet except for shoaling along the edges. A rock which bares is on the E side of the bay on the S side of the channel leading to **Horse Shoe Pond.**

Anchorages.–Good anchorage is in the center of Presque Isle Bay in depths of 12 to 22 feet, mud bottom. Local regulations prohibit vessels from anchoring in any channel or mooring to channel markers and buoys. Vessels over 100 feet long or over 50 tons are prohibited from anchoring within 500 feet of the city water intake or sewer pipelines. The city water intake extends NW across Presque Isle Bay and is marked by buoys.

Dangers.–An unmarked submerged pier, covered 1 to 2 feet, extends about 2,000 feet from shore 0.8 mile SSE of Erie Harbor Pierhead Light.

Weather.–(See page T-4 for **Erie climatological table.**)

Towage.–Tugs for Erie are available from Conneaut or Cleveland. (See Towage under Conneaut and Cleveland.)

Erie is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural

quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard.–Erie Coast Guard Station is on the N side of the entrance channel.

Harbor Regulations are established by the Erie-Western Pennsylvania Port Authority and enforced by the **harbormaster**, who may be reached at the Municipal Building. A **speed limit** of 3 mph (2.6 knots) is enforced in the East and West Canal Basins and within 300 feet of the shoreline, and 5 mph (4.4 knots) elsewhere in the harbor. Copies of the regulations may be obtained from the Port Authority Office, 507 Municipal Building, Erie, Pa. 16501.

Wharves.–The piers and wharves of Erie Harbor are along the S side of Presque Isle Bay. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operator.) All the facilities described have highway and rail connections. Water and electrical shore-power connections are available at some of the piers and wharves.

General cargo at the port is usually handled by ship's tackle; special handling equipment, if available, is mentioned in the description of the particular facility. Cranes to 300 tons are available at the Erie International Marine Terminal.

Erie International Marine Terminal, Berths No. 1, 2, and 3: S side of entrance channel at inner end of S pier; 1,450 feet of berthing space; 23 to 26 feet alongside; deck height, 8½ feet; 65,000 square feet covered storage; 22 acres open storage; 300-ton fixed crane; 125-, 140-, and 200-ton crawler cranes; receipt and shipment of general and containerized cargo, dry bulk commodities, vehicles, steel products, and lumber; owned by Port Authority, City of Erie and operated by Codan Corp.

Erie Dry Bulk Wharf: (42°08'25'N., 80°05'00"W.); 1,220-foot face; 24 to 22 feet alongside; deck height, 7½ feet; about 5.5 acres open storage; use of cranes from Erie Sand and Gravel Company Dock; receipt of salt, sand and coal; owned by Port Authority, City of Erie and operated by Erie Sand and Gravel Co.

Erie-Western Pennsylvania Port Authority Grain Terminal Wharf: (42°08'20"N., 80°05'12"W.); 1,000 feet of berthing space; 12 to 24 feet alongside; deck height, 5 feet; 2½-million-bushel grain elevator; two marine legs, unloading rate 20,000 bushels per hour; vessel-loading spout, rate 10,000 bushels per hour; owned by Erie-Western Pennsylvania Port Authority.

Erie Sand and Gravel Company Dock: (42°08'13"N., 80°05'38"W.); 305-foot N face, 19 to 21 feet alongside; 1,031-foot E face, 21 to 14 feet alongside; deck height, 6 feet; open storage for about 1 million tons of material; one crawler crane and an 8-ton mobile crane; receipt of sand and limestone; owned and operated by Erie Sand and Gravel Co.

Austin Dock No. 4: (42°07'47"N., 80°06'30"W.); 1,070-foot W face; 21 feet alongside; deck height, 10 feet; open storage for 100,000 tons each of limestone and salt and 30,000 tons of sand; three mobile front-end loaders; receipt of sand, limestone, salt, and pig iron; shipment of clay; owned by Perry Shipbuilding Corp. and operated by Lawrence Erie Stone Co., subsidiary of Austin Services, Inc.

Erie Builders Concrete Company dock: across slip W of Austin Dock No. 4; 1,060-foot W face; 20 to 16 feet alongside; deck height, 12 feet; 80,000 square feet open storage for about 50,000 tons of sand and limestone; two mobile front-end loaders; receipt of sand and crushed limestone; owned by Perry Shipbuilding Corp. and operated by Erie Builders Concrete Co.

Perry Shipbuilding Corp. Dock: across slip W of Erie Builders Concrete Company Dock; 1,000 feet of berthing space E side; 17 to 6 feet alongside; deck height, 10 feet; pipelines extend to tank storage with 198,000-barrel capacity; receipt of petroleum products; owned by Perry Shipbuilding Corp. and operated by United Oil Manufacturing Co. and Perry Shipbuilding Corp.

Supplies.–By special arrangement, local dealers make tank truck deliveries of bunker fuel to vessels at the berths. Diesel fuel, marine supplies, and provisions are available at Erie.

Repairs.–The port has no active drydock or major repair facilities for deep-draft vessels. The nearest such facilities are at Lorain, Ohio. A repair plant in the SW part of the harbor makes above-the-waterline repairs to vessels at their berths or at the inner end of the Erie Builders Concrete Company Dock. The company maintains a graving dock for construction in the SE part of the harbor, but occasionally uses it for repair. The dock is 1,250 feet long, 120 feet wide at the entrance, and has a depth of 21 feet over the sill. Mobile cranes to 125 tons and yard shops are available.

Small-craft facilities.–Numerous marinas and boatyards in **Canal Basin** on the S side of Erie Harbor provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and marine supplies. Mobile lifts to 30 tons, fixed lifts to 60 tons, and marine railways to 100 tons are available for hull, engine, and electronic repairs. In 1977, depths of 4½ to 12 feet were reported alongside the gasoline docks.

Presque Isle State Park Marina is in a dredged basin on the NW side of Presque Isle Bay. The entrance to the basin is marked by private lights and a **339°45'** lighted range. In 1977, the reported controlling depths were 9 feet on the centerline in the entrance, 8 feet in the basin except for an isolated 6-foot spot in the E part, and 8 feet alongside the berths. Gasoline and a launching ramp are available. Mobile lifts to 10 tons are available for emergency propellor and minor repairs.

A municipal marina, protected by breakwaters, is

S of the Erie Harbor entrance channel. The marina entrance is marked by private lights.

Communications.–Erie is connected by air, rail, and highway to other major United States and Canadian cities. Passenger ferries operate between the city of Erie and the SE side of Presque Isle.

Charts 14824, 14828.–From the neck of Presque Isle, the shoreline extends about 23 miles SW to Conneaut Harbor. The shore in this stretch has the appearance of low wooded hills with interspersed communities. Deep water is about 0.8 mile offshore.

The **State boundary** between Pennsylvania and Ohio is about 1.5 miles E of Conneaut.

Conneaut Harbor, serving **Conneaut, Ohio**, is about 107 miles SW of Buffalo and about 73 miles NE of Cleveland. It comprises an outer harbor sheltered by breakwaters and an inner harbor in the lower part of the **Conneaut River.**

A large unmarked **dumping ground** with a least depth of 41 feet in 1976 is 5 miles NW of the harbor entrance.

Prominent features.–Green water tanks 1.7 and 2.8 miles SSW of the harbor are prominent.

Conneaut Harbor West Breakwater Light (41°58.8'N., 80°33.4'W.), 80 feet above the water, is shown from a square white pyramidal tower with a black band on the outer end of the W breakwater. A fog signal is at the light.

Channels.–The harbor is entered from natural deep water in Lake Erie between converging breakwaters to a dredged basin inside the breakwaters. A dredged channel leads from the SE corner of the basin upstream in Conneaut River for about 0.4 mile to the wharves on either side of the river. A dredged channel leads S from the SW part of the basin to the Municipal Pier about 0.4 mile SW of the mouth of the river. Lights mark the outer ends of the breakwaters and the piers at the river mouth. In May 1985, the controlling depths were 26 feet in the E part of the basin with lesser depths along the NE and SE sides and 15 to 20 feet in the W part except for shoaling along the W and SW sides, thence 26 feet in the river channel; the access channel to the Municipal Pier had a midchannel controlling depth of 6 feet.

A privately dredged turning basin in the river immediately above the limit of the dredged channel had a controlling depth of 20 feet in 1979 except for shoaling along the edges. A private slip extending S from the turning basin has a least depth of 17 feet near the S end.

Anchorages.–Vessels are reported to anchor W of the W breakwater in 28 to 38 feet, but the holding ground is poor in shale bottom.

Dangers.–Vessels approaching the harbor from the E are cautioned to not mistake the lights on the piers at the river mouth for the breakwater lights. Use of the gap in the W breakwater should be strictly avoided, because of a large shoal area in the outer harbor W of the municipal pier.

In December 1978, a large anchor was reported lost in the E part of the outer harbor in about 41°58'33.3"N., 80°33'03.8"W.

Bridges.–An overhead cable crossing the SE side of the privately dredged turning basin in the river has a clearance of 124 feet. An inoperative swing bridge with a clearance of 3 feet crosses the Conneaut River just above this cable. An overhead cable with a clearance of 122 feet crosses the entrance to the slip that extends S from the privately dredged turning basin.

Towage.–Tugs to 1,250 hp are available in Conneaut Harbor. Arrangements for tugs are made through the Great Lakes Towing Co. dispatcher in Cleveland at 800-621-4330 or on VHF-FM channels 16 (156.80 MHz), 10 (156.50 MHz), 12 (156.60 MHz), and 18A (156.90 MHz) via remote antenna. The tugs' VHF-FM channels include 16, 6 (156.30 MHz), 12, 14 (156.70 MHz), and 18A. At least 2 hours advance notice is requested.

Ashtabula/Conneaut is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Harbor regulations.–A **speed limit** of 6 mph (5.2 knots) is enforced in the harbor except in the outer harbor where the speed limit is 10 mph (8.7 knots). (See **33 CFR 162.160 and 207.570,** chapter 2, for regulations.)

Wharves.–The deep-draft facilities at Conneaut Harbor are in the inner harbor inside the mouth of the Conneaut River. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operator.) All the facilities described have rail connections and all but the Pittsburgh and Conneaut Dock Co., Dock No. 4, have highway connections. All the described facilities have water and electrical shore-power connections.

Pittsburgh and Conneaut Dock Co., Dock No. 1 Extension: (41°58'12"N., 80°32'58"W.); 1,974-foot face; 27 to 22 feet alongside; deck height, 8½ feet; open storage for 600,000 tons of limestone; three crawler cranes; two front-end loaders; receipt of limestone; owned by Bessemer and Lake Erie Railroad Co. and operated by United States Steel Corp., Eastern Limestone Operation.

Pittsburgh and Conneaut Dock Co., Dock No. 3: E side of slip S of the turning basin; 1,250-foot face; 27 to 28 feet alongside; deck height, 8½ feet; one fixed coal loading tower, capacity 7,000 tons per hour; one slewing coal loader, capacity 4,000 tons per hour; conveyor system for 3½-million-ton open storage area; shipment of coal; occasional bunkering of vessels; owned by Bessemer and Lake Erie Railroad Co. and operated by Pittsburgh and Conneaut Dock Co.

Pittsburgh and Conneaut Dock Co., Dock No. 4: E side of river opposite Dock No. 1 extension; 2,078 feet of berthing space; 27 to 28 feet alongside; deck height, 8½ feet; five 17-ton hulett-type ore unloaders, capacity 875 tons per hour each; open storage for 3½ million tons of ore; receipt of iron ore and limestone; owned and operated by Pittsburgh and Conneaut Dock Co.

Supplies.–Diesel oil by tank truck and some marine supplies and provisions are available at Conneaut.

Small-craft facilities.–A dredged channel extends S from the outer basin to the Municipal Pier 0.4 mile SW of the river mouth. In May 1979, the controlling depths were 3 feet at midchannel, with 3 feet along the N pier face, and thence in 1977, 2 to 7 feet reported along the W face. Gasoline, diesel fuel, and electricity are available.

The Conneaut Port Authority operates a small-craft basin NE of the Municipal Pier. The entrance to the basin is marked by private lights. In 1977, the reported controlling depth was 5 feet in the entrance with 3 to 18 feet alongside the berths. Transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, and launching ramps are available.

Communications.–Conneaut has good highway and rail connections.

Charts 14824, 14828, 14825.–From Conneaut to Ashtabula, 13.5 miles SW, there is deep water about 0.8 mile offshore. The shore is a series of low wooded hills with interspersed communities.

Two wrecks, covered 35 feet, are 1.5 miles offshore about 3.9 miles ENE of the entrance to Ashtabula Harbor.

Charts 14825, 14828, 14836.–**Ashtabula Harbor** is about 119 miles SW of Buffalo and about 59 miles NE of Cleveland. It comprises an outer harbor, the navigable portion of the **Ashtabula River** for about 2 miles above the mouth, and two large slips opening directly into the lake under the protection of the breakwaters.

The major commodities handled at the port are limestone, iron and other ores, coal and other dry bulk commodities, pig iron, iron products, raw rubber, and general cargo in the domestic trade.

Two unmarked **dumping grounds,** with least reported depths of 35 feet, are 2.4 miles N and 2 miles NE of the harbor entrance.

Prominent features.–The lighted stacks 1.5 miles SE and 1.8 miles ESE of the harbor entrance are conspicuous. The silos on the W side of the river mouth are also prominent.

Ashtabula Harbor Light (41°55.1'N., 80°47.8'W.), 51 feet above the water, is shown from a white cylindrical tower on a white square house near the outer end of W breakwater. A fog signal and radiobeacon are at the light.

Channels.–The harbor is entered from Lake Erie through a dredged entrance channel between converging breakwaters that are marked at the outer ends by lights. Inside the breakwaters, the outer harbor divides into E and W channels with a central turning basin. The limits of the dredged areas in the outer harbor are marked by buoys. The W channel leads along the W breakwater and around the W end of an inner detached breakwater to the mouth of the ConRail Minnesota Slip and to the mouth of the Ashtabula River and thence upstream for about 2 miles; a turning basin is 0.3 mile below the head of the project. A light marks the W end of the inner detached breakwater. The E channel leads SE to a basin off the entrance to two large slips. A triangular turning basin is between the two outer channels on the N side of the inner detached breakwater.

In April 1984, the midchannel controlling depths were 27 feet from the breakwater entrance through the W channel to a point abreast the inner breakwater, thence 24 feet to the mouth of the river, thence 21 feet to the mouth of the ConRail Minnesota Slip, thence 17 feet for about 0.4 mile in the river channel, thence 15 feet to the Fifth Street bridge, thence in 1983, 9 feet to the Ashtabula Yacht Club except for shoaling to less than 1 foot on the S side of the channel at the yacht club slip entrance, thence 6 feet to a point about 800 feet downstream of the ConRail bridge, thence 2 feet to the turning basin just below the limit of the Federal project with 4 feet in the basin entrance and 3 to 6 feet in the basin, thence 3 feet to the limit of the project. In April 1984, the midchannel controlling depth in the E channel was 28 feet, thence 27 feet in the basin except for shoaling along the edges. The triangular turning basin had a controlling depth of 21 feet except for shoaling to 18 feet along the S and E edges.

Anchorages.–Deep-draft vessels normally anchor about 2 miles ENE or W of the breakwater entrance in 35 to 45 feet, sand and mud bottom.

Bridges.–An overhead conveyor with a clearance of 100 feet crosses the Ashtabula River 0.5 mile above the mouth. The Fifth Street bridge 0.15 mile upstream has a bascule span with a clearance of 11 feet. The ConRail bridge about 1.5 miles above the river mouth has a bascule span with a clearance of 11 feet. An overhead cable on the N side of the bridge has a clearance of 131 feet. (See **33 CFR 117.1 through 117.59 and 117.847,** chapter 2, for drawbridge regulations.)

Local bridge regulations.–

147.35 Bridges to be Lighted.

All bridges over the Ashtabula River in the City of Ashtabula shall be lighted in accordance with the regulations of the United States Coast Guard, and lights shall be visible on a dark night with clear atmosphere at least one (1) nautical mile or about 2,000 yards.

147.36 Vessels Passing through Bridges.

All vessels navigating the harbor when passing any bridge shall be moved as expeditiously as is consistent with a proper movement in the river, and shall not be anchored or fastened to interfere with the opening or closing of any bridge.

147.37 One Vessel Tow.

It shall be unlawful for any person to cause any vessel to tow more than one vessel at a time through any movable bridge in the harbor, providing that this shall not be construed as applying to scows or yachts.

147.41 Duty of Bridge Operators.

It shall be the duty of the bridge operator in all cases to report to his immediate superior and the Harbor Master any infraction of this article.

147.42 Penalty for Violation.

Any master, owner or person in possession, charge or control of any vessel, or any other person, firm or corporation who shall violate any of the provisions of this article shall be fined not less than fifty dollars ($50.00) nor more than five hundred dollars ($500.00).

Towage.–Tugs to 1,400 hp are available at Ashtabula. Arrangements for tugs are made through the Great Lakes Towing Co. dispatcher in Cleveland at 800-621-4330 or on VHF-FM channels 16 (156.80 MHz), 10 (156.50 MHz), 12 (156.60 MHz), and 18A (156.90 MHz) via remote antenna. The tugs' VHF-FM channels include 16, 6 (156.30 MHz), 12, 14 (156.70 MHz), and 18A. At least 2 hours advance notice is requested.

Ashtabula/Conneaut is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard.–Ashtabula Coast Guard Station is on the E side of the Ashtabula River about 0.5 mile above the mouth.

Harbor regulations.–A **speed limit** of 6 mph is enforced in the harbor except in the outer harbor where the speed limit is 10 mph (8.7 knots). (See **33 CFR 162.160 and 207.570,** chapter 2, for regulations.)

Local harbor regulations are established by the City Council and enforced by the **harbormaster** who may be reached at the Port Authority Office. The harbormaster controls vessel movement and berthage in the harbor. Local regulations specify a **speed limit** of 6 mph (5.2 knots) in the harbor for vessels over 100 feet long. Copies of the regulations may be obtained from Port Authority Office, 529 Prospect Road, Ashtabula, Ohio 44004.

Wharves.–The wharves of Ashtabula Harbor are on the S side of the outer harbor and along both sides of the Ashtabula River. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operator.) All the facilities described have highway connections, and all except the R. W. Sidley Wharf have railway connections. Water and electrical shore-power connections are available at most of the facilities.

Facilities in the Ashtabula River:

Consolidated Rail Corp., Coal Dock No. 10: W side of the river inside the mouth; 2,800-foot face; 27 to 14 feet alongside; deck height, 7 feet; one traveling coal loader, capacity 8,000 tons per hour; open storage for 1½ million tons of coal; shipment of coal; owned by ConRail and operated by the Lower Lake Dock Co.

R. W. Sidley Wharf: E side of the river 0.6 mile above the mouth; about 350 feet of berthing space; 15 to 17 feet alongside; one crawler crane; one mobile front-end loader; open storage for 60,000 tons of limestone; receipt of limestone; owned and operated by R. W. Sidley, Inc.

Facilities in the outer harbor:

Consolidated Rail Corp., Dock No. 1 Extension: S side of outer harbor between river mouth and ConRail Minnesota Slip, and outer end of W side of ConRail Minnesota Slip; 1,030-foot N face, 25 to 17 feet alongside; 1,165-foot E face, 27 feet alongside; deck height, 7 feet; four hulett-type ore unloaders; open storage for 1 million tons of iron ore; receipt of iron ore; owned by ConRail and operated by Ashtabula and Buffalo Dock Co.

Consolidated Rail Corp., Dock No. 2 Extension: Outer end of E side of ConRail Minnesota Slip; 1,198-foot face; 27 feet alongside; deck height, 7 feet; one front-end loader; open storage for 1 million tons of iron ore; receipt of iron ore; owned by ConRail and operated by Ashtabula and Buffalo Dock Co.

Pinney Dock No. 1: W side of Slip No. 1, about 0.5 mile E of the river mouth; 2,000-foot face; 28 to 30 feet alongside; deck height, 8 feet; 10 mobile front-end loaders; open storage for about 2 million tons in rear of Docks 1, 2, and 3; receipt of sand, quartz, limestone, and manganese ore; owned and operated by Pinney Dock and Transport Co., Inc.

Pinney Dock Nos. 2 and 3: E side of Slip No. 1 and W side of Slip No. 2, about 0.6 mile E of the river mouth; Dock No. 2, 2,000-foot face, 28 to 30 feet alongside; Dock No. 3, 2,000-foot face, 27 feet alongside; deck height, 8 feet; use of mobile equipment from Dock No. 1; receipt of sand, quartz, limestone, and manganese ore; owned and operated by Pinney Dock and Transport Co., Inc.

Pinney Dock No. 4: E side of Slip No. 2: 2,000-foot face; 27 feet alongside; deck height, 7 feet; two 45-ton gantry cranes; use of mobile equipment from Dock No. 1; 131,000 square feet covered storage; about 5 acres open storage; receipt and shipment of general cargo, receipt of raw titanium ore, china clay, pig iron, newsprint, lumber, raw rubber, and scrap metal; owned and operated by Pinney Dock and Transport Co., Inc.

Supplies.–Diesel oil by tank truck and limited marine supplies and provisions are available at Ashtabula.

Repairs.–Three companies in Ashtabula make above-the-waterline repairs and install equipment and machinery for vessels at berth in the harbor.

Small-craft facilities.–Several marinas on the Ashtabula River provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. Mobile lifts to 40 tons are available for hull, engine, and electronic repairs. In 1977, depths of 8 to 16 feet were reported alongside the berths.

Communications.–Ashtabula is served by ConRail and Norfolk and Western Railway, and has good highway connections.

Charts 14825, 14828, 14829.–From Ashtabula SW for 27 miles to Fairport, the shore continues as a series of low wooded hills and small communities. Deep water is about 1 mile offshore. A sunken wreck, covered 10 feet, is about 0.6 mile offshore about 15 miles SW of Ashtabula. A boulder, covered 15 feet, is about 3 miles ENE of the entrance to Fairport Harbor.

Charts 14825, 14829, 14837.–**Fairport Harbor** is about 29 miles NE of Cleveland Harbor. It comprises an outer harbor, and an inner harbor formed by the lower 1 mile of the **Grand River.**

An unmarked **dumping ground** with a least reported depth of 35 feet is 3.5 miles NNE of the harbor entrance.

Prominent features.–The stacks and tanks of a chemical plant 1.3 miles SE of the harbor entrance are very prominent from offshore.

Fairport Harbor West Breakwater Light (41°46.1'N., 81°16.9'W.), 56 feet above the water, is shown from a white square tower on the corner of a square building about 500 feet from the outer end of the W breakwater. A fog signal and radiobeacon are at the light.

Channels.–The harbor is entered from Lake Erie through a dredged channel from deep water in the lake between two converging breakwaters to an outer harbor basin. From its inner end, the E breakwater turns E and parallels the shore for about 1 mile. Lights mark the outer ends of the breakwaters and the E end of the E breakwater. From the outer harbor basin, the mouth of the river is entered between parallel piers, marked at the outer ends by lights, and the channel extends upstream for 1.5 miles. There is a turning basin on the W side of the channel about 1 mile above the mouth.

In May 1985, the controlling depths were 23 feet from deep water in the lake through the entrance channel and outer basin with lesser depths along the W flared edge of the entrance channel, thence 16 feet (19 feet at midchannel) to the turning basin, thence 11 feet (13 feet at midchannel) to the upstream limit of the Federal project. Depths were 9 to 21 feet in the dredged part of the outer basin W of the channel and 12 to 21 feet E of the channel. The turning basin had a controlling depth of 18 feet except for shoaling to 12 feet along the S edge of the basin.

Dangers.–A wreck, covered 30 feet, is about 0.6 mile NW of the breakwater entrance. A shoal that extends NW from the N end of the W breakwater tends to encroach the W side of the approach channel. Deep-draft vessels should avoid favoring the W channel limit when entering or leaving the harbor. At times a very strong current past the river mouth pierheads makes it difficult and dangerous for unaided vessels to enter the river channel.

A wreck, covered 6 feet, is in the outer harbor basin about 1,000 feet E of East Pier Light in about 41°45'41"N., 81°16'35"W.

Mariners are cautioned to avoid dragging anchor over the submerged pipeline just above the river mouth. The harbormaster reports that vessels sometimes scrape the pipeline during low water conditions.

The E end of the E breakwater may become submerged during certain weather conditions. It is marked by unlighted buoys.

Towage.–Tugs for Fairport Harbor are available from Ashtabula or Cleveland. (See Towage under Ashtabula and Cleveland.)

Fairport Harbor is a **customs station.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard.–Fairport Harbor Coast Guard Sta-

Structures across Grand River at Fairport

**Miles above West Breakwater Light*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
1	Overhead cable	Power	1.32				120	
2	Baltimore & Ohio RR bridge	Railroad	2.16	52	56		18	Fixed.
3	Overhead cables	Power	2.50				15	Note 1.
4	Baltimore & Ohio RR bridge	Railroad	2.73			72	20	Fixed.
5	Overhead cable	Power	2.74				40	
6	High St. bridge	Highway	2.76	115	115		10	Fixed.
7	Overhead cable		2.77				23	
8	St. Clair St. bridge	Highway	3.24			90	15	Fixed.

Note 1.–Cables cross the river from the N bank to an island at midstream.

tion is on the W side of the river just inside the mouth.

Harbor Regulations are enforced by the harbormaster who may be reached through the Chief of Police, 220 3rd Street, Fairport Harbor, Ohio 44077. **Speed limits** of 6 mph (5.2 knots) and 10 mph (8.7 knots) are enforced in Grand River and in the outer harbor, respectively. (See **33 CFR 162.160 and 207.570**, chapter 2, for regulations.) Copies of the local regulations may be obtained from Village Hall, 220 3rd Street, Fairport Harbor, Ohio 44077.

Wharves.–Fairport Harbor has numerous wharves and docks in Grand River. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operator.) All the facilities described have highway connections and many have railway connections. Some of the facilities have water available.

Union Sand and Supply Corp. Dock: E side of river 0.25 mile above pierheads; 1,119-foot face; 23 to 15 feet alongside; deck height, 10 feet; one front-end loader; open storage for 100,000 tons of material; receipt of sand and limestone; owned by Fairport Development Co., Inc., and operated by the Union Sand and Supply Corp.

Northeastern Road Improvement Co. Dock: E side of river above Union Sand and Supply Corp. Dock; 1,000-foot face; 23 to 15 feet alongside; deck height, 10 feet; one front-end loader; open storage for 200,000 tons of limestone; receipt of limestone; owned and operated by the Northeastern Road Improvement Co.

Standard Machine and Equipment Co. Wharf: E side of river 1.2 miles above pierheads; 1,300 feet of berthing space; 23 to 20 feet alongside; deck height, 8 feet; two front-end loaders; 18-ton traveling bridge crane; open storage for 600,000 tons of limestone; owned by The Ceico Co. and operated by Standard Machine and Equipment Co.

Painesville Grand River Dock Co. Dock: W side of the river 0.3 mile above the pierheads; 1,540 feet berthing space along natural bank; 22 to 18 feet alongside; deck height, 4 to 5 feet; one crawler crane and three front-end loaders; open storage for 100,000 tons of material; receipt of limestone and sand; owned by A. J. Ronyak, Inc., and R. W. Sidley, Inc., and operated by Painesville Grand River Dock Co.

Morton Salt Co. Fairport Plant Dock: W side of the river 0.5 mile above the pierheads; 600 feet of berthing space with dolphins; 24 to 20 feet alongside; deck height, 10 feet; one fixed, offshore loading tower, capacity 1,000 tons per hour; storage silos for 12,000 tons of salt; open storage for 250,000 tons of salt; shipment of bulk salt; owned and operated by Morton Salt Co.

Republic Steel Lime Co. Dock: W side of the river 0.75 mile above the pierheads; about 1,700 feet of berthing space along natural bank; 24 feet alongside; deck height, 3½ to 4 feet; two front-end loaders; storage silos for 17,000 tons of lime; open storage for 400,000 tons; receipt of limestone; owned by Republic Steel Corp. and operated by Republic Steel Lime Co.

Osborne Concrete and Stone Co. Dock: On N and W sides of turning basin 1 mile above the pierheads; 400 feet of berthing space along natural bank on N side of basin, 19 to 18 feet alongside; 650 feet of berthing space along natural bank on W side of basin, 19 to 18 feet alongside; deck height, 4 feet; three front-end loaders and one mobile crane; open storage for 100,000 tons of material; receipt of limestone and sand; owned and operated by Osborne Concrete and Stone Co.

Supplies.–Bunker fuel is available by tank vessel from Cleveland. Limited marine supplies and provisions are available at Fairport Harbor.

Small-craft facilities.–Several marinas on the Grand River provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Mobile lifts to 18 tons are available for hull, engine, and electronic repairs. In 1977, depths of 2 to 7 feet were reported alongside the berths.

Communications.–Fairport Harbor has good highway connections and is served by the Baltimore and Ohio railroad.

Charts 14825, 14826, 14829.–From Fairport Harbor, the shoreline trends SW for about 29 miles to the main entrance to Cleveland Harbor. There is deep water about 1 mile offshore at Fairport Harbor, decreasing to 0.5 mile or less offshore at Cleveland. Several small-craft harbors and marinas are along this stretch of low wooded hills.

Charts 14825, 14829.–**Mentor Harbor,** about 4.5 miles SW of Fairport Harbor, comprises a group of privately developed small-craft channels and basins. The entrance to the harbor, protected by parallel breakwaters, is marked by private lights on the outer and inner ends of the breakwaters; a private 142° range marks the approach. Local yachting interests usually maintain the entrance channel, close to the E breakwater. After strong NW to NE winds, sandbars are reported to form in the entrance channel. In May 1985, depths of 10 feet were reported in the entrance channel with, in 1979, 4 feet alongside the berths in the harbor. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, and marine supplies are available. Mobile lifts to 25 tons are available for hull, engine, and electronic repairs.

A wreck, covered 20 feet, is 1.5 miles WNW of the entrance to Mentor Harbor.

Chagrin River is about 10 miles SW of Fairport Harbor. The entrance is marked by a private light on the E side and by private lights on the pier on the W side of the mouth. In 1976, the controlling depth in the river was 1 foot, except for shoaling to bare on the E side about 200 feet inside the entrance. Several marinas in the river provide transient berths, water, electricity, sewage pump-out, marine supplies, and launching ramps. Mobile lifts to 30 tons are available for hull, engine, and electronic repairs. In 1977, depths of 4 to 6 feet were reported alongside the berths.

The intake channel of a powerplant is just W of the mouth of Chagrin River. A private light marks the outermost part of the breakwaters that protect the channel.

Charts 14826, 14829.–The Wildwood Yacht Club harbor is about 5.4 miles NE of Cleveland Harbor East Entrance Light, close NE of **Euclid Creek.** The entrance is marked by private lights on the ends of the E and W pierheads. In 1977, the reported controlling depths were 7 feet in the entrance, and 7 to 11 feet in the harbor.

The Northeast Yacht Club Basin is adjacent to the Cleveland sewage disposal plant, about 4 miles NE of Cleveland Harbor East Entrance Light. The entrance is marked by private lights on the E end of the N breakwater and the N end of the E breakwater. In 1977, the reported controlling depth was 6 feet in the entrance and in the basin.

In July 1984, a dangerous submerged wreck was reported about 2 miles NW of the mouth of Euclid Creek in about 41°36′N., 81°36′W.

About 3.1 miles SW of Euclid Creek, at the mouth of a stream known locally as **Dugway Brook,** are submerged pilings in 12 feet of water.

Charts 14826, 14829, 14839.–Cleveland Harbor, about 175 miles SW of Buffalo and 95 miles E of Toledo, consists of an outer harbor formed by breakwaters and an inner harbor made up of the **Cuyahoga River,** and the **Old River** which was the original outflow channel of the Cuyahoga River. The city of **Cleveland, Ohio,** is one of the major industrial centers on Lake Erie.

The major commodities handled at the port are iron, steel, and aluminum products; limestone, iron ore, sand, stone, salt, and other minerals; petroleum products and other liquid bulk cargo; and general and containerized cargo in the foreign trade.

Vessels calling at Cleveland Harbor may obtain information on river traffic by contacting the Great Lakes Towing Co. dispatcher on VHF-FM channels 16 (156.80 MHz) or 10 (159.50 MHz), or by radiotelephone through a land station, telephone, 621–5094.

An unmarked **dumping ground** with a least reported depth of 35 feet is about 9.3 miles N of the main entrance to Cleveland Harbor.

Prominent features.–The most prominent objects when approaching Cleveland Harbor are the Municipal Stadium 0.7 mile E of the mouth of the Cuyahoga River, the Federal Office Building and the Erieview Plaza Tower about 1.1 miles E of the mouth, the Terminal Tower 1 mile SE of the mouth, and the lighted "W" sign 3.3 miles W of the mouth on the lakefront.

Cleveland Waterworks Intake Crib Light (41°32.9′N., 81°45.0′W.), 55 feet above the water, is a private aid shown from a gray square house on a red cylindrical crib about 3.3 miles NW of the harbor entrance. A fog signal is at the light.

Cleveland Harbor East Entrance Light (41°32.6′N., 81°39.1′W.), 59 feet above the water, is shown from a white skeleton tower with an enclosed top at the NE end of the outer harbor breakwater.

Cleveland Harbor West Pierhead Light (41°30.5′N., 81°43.1′W.), 63 feet above the water, is shown from a white conical tower with attached building on the W side of the main entrance to Cleveland Harbor. A fog signal and radiobeacon are at the light.

Channels.–Cleveland outer harbor is formed by a series of breakwaters paralleling the shore for about 1 mile W and 4 miles E of the mouth of the Cuyahoga River. Lights mark the ends of each of the breakwaters. The main entrance from Lake Erie is through a dredged approach channel opposite the mouth of the river. The harbor may also be entered at the E end, and small craft may enter at the W end. The anchorage in the outer harbor has a mud and sand bottom. In the inner harbor, dredged channels lead upstream for about 5.6 miles in the Cuyahoga River and for about 1 mile in Old River, which branches W from Cuyahoga River 0.4 mile above the mouth. Lighted and unlighted buoys mark the limits of the dredged areas in the outer harbor. The piers at the mouth of the river are marked on the outer ends by lights.

The Federal project depths are 29 feet in the approach channel from deep water in the lake, thence 28 feet through the entrance channel to the mouth of the river and in West Basin, 28-27 feet in East Basin, and 25 feet in Airport Range. In the inner harbor, project depths are 27 feet in the Cuyahoga River from the mouth to the junction with Old River, thence 23 feet to the upstream limit of the project, and 27 feet in Old River. (See Notice to Mariners and latest edition of charts for controlling depths.)

A diked disposal area is in the outer harbor at the NE end of Burke Lakefront Airport.

About 1 mile E of the East Entrance Light, at Gordon Park, a breakwater extends about 1,000 feet NW from shore, then curves to SW for about 1,000 feet. The outer portion is mostly submerged and is marked along its outer side by private unlighted buoys. In April 1978, an 88-acre diked disposal area was under construction enclosing the breakwater and extending E. Orange and white buoys mark the construction area; lights mark the dike.

Anchorages.–Deep-draft vessels normally anchor about 2 miles SW or 3 miles E of Cleveland Waterworks Intake Crib Light in about 40 to 48 feet of water, clay and gravel bottom. The holding ground at these locations is reported to be good. Avoid anchoring over the potable water intake, the outer end of which is marked by a lighted buoy 0.7 mile W of Cleveland Waterworks Intake Crib Light. General anchorages are in the NW part of West Basin and S of the dredged channel in the E part c East Basin. An explosives anchorage is on the NW side of the E breakwater. (See **33 CFR 110.1 and**

110.207, chapter 2, for limits and regulations.) In 1977, it was reported that the East Basin general anchorage and the explosives anchorage had not been used for about 10 years. The West Basin anchorage has a sand and mud bottom and is used only occasionally. The harbormaster, who has control of the waters for all three anchorages, generally orders vessels to anchor outside the harbor. Vessels are prohibited from anchoring within 2,000 feet W of the main entrance channel.

Dangers.–During flood stages of the Cuyahoga River, debris may be encountered in the river and in the outer harbor.

Caution.–A submerged cable extends NNW from shore to Cleveland Harbor East Entrance Light. Vessels are cautioned not to drag anchor over the cable.

Local bridge regulations.–Sec. 7.1511. A copy of the ordinances relating to the management of bridges and viaducts and the signals for opening and closing the same shall be posted up in the pilot house of every tug employed in navigating the Cuyahoga River or old river bed, and the harbormaster is hereby instructed to furnish, upon application, a printed copy of the same to the master of any such tug.

Sec. 7.1701. No more than one boat or craft for which the draw of any bridge has to be opened or swung shall pass through said draw at the same time.

Sec. 7.1706. The captain, bridgetenders, or other persons in charge of any of the drawbridges shall not close the same against vessels or boats seeking to pass through, until passengers and teams have been delayed fully 10 minutes by the said draws of the above-mentioned bridges being open.

Sec. 7.1708. The director of port control shall by rule designate the hours when it may be necessary to keep any city drawbridge closed for the accommodation of traffic.

Sec. 7.1713. No material of any kind shall be deposited under any of the viaducts, without a permit from the Director of Port Control; no material shall be deposited adjacent to viaduct that would injure the structure in case of fire; and no bills, posters, or advertisements of any kind shall be posted on any part of any viaduct.

Sec. 7.1714. Any person violating any of the provisions of this subdivision shall be fined not less than $5 nor more than $25, and shall also be liable to the city for all damage that may be done to the drawbridge by collision or otherwise.

Weather.–(See page T-5 for **Cleveland climatological table.**)

Towage.–Tugs to 2,000 and 1,200 hp are available from Great Lakes Towing Co. or Gaelic Tugboat Co., respectively. Arrangements for tugs are made through the companies' dispatchers in Cleveland at 216-621-4854 (in Ohio, toll free: 800-621-4330) or 216-566-0400, respectively. Both dispatchers may be contacted on VHF-FM channel 16 (156.80 MHz).

At least 2 hours advance notice is requested. Vessels carrying 1,200 tons or more of gasoline, oil, explosives, or other dangerous material, and all vessels carrying 3,000 tons or more of cargo of any kind, must have the assistance of a tug or tugs while navigating the Cuyahoga River S of Superior Avenue.

Cleveland is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard.–A **Marine Safety Office,** a **vessel documentation office,** and the headquarters of the Ninth Coast Guard District are at Cleveland. (See appendix for addresses.) **Cleveland Coast Guard Station** is on the S side of the outer harbor just W of Burke Lakefront Airport.

Harbor Regulations.–Federal regulations specify a **speed limit** of 6 mph (5.2 knots) in the harbor except in the outer harbor where the speed limit is 10 mph (8.7 knots) (See **33 CFR 162.160 and 207.570,** chapter 2, for regulations.) However, the city of Cleveland has adopted a lesser **speed limit** of no wake, 4 mph (3.5 knots) in the Cuyahoga River and Old River. During fog or when a blue light or flag is shown from any pier, wharf, bridge or other place where person or property may be endangered, a **speed limit** of 2 mph (1.7 knots) is enforced.

Local harbor regulations are established by the city of Cleveland and enforced by the **harbormaster** who can be contacted at Water Control Laboratory, New West Pier, Whiskey Island, c/o Water Control Laboratory, 1201 Lakeside Avenue, Cleveland, Ohio 44114. Copies of the regulations can be obtained from the Office of the City Clerk, Room 216, City Hall, 601 Lakeside Avenue, Cleveland, Ohio 44114.

Wharves.–There are extensive waterfront facilities in Cleveland outer harbor and along both banks of Cuyahoga River and Old River. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 43, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operator.) All the facilities described have highway connections, and many have railway, water, and electrical shore-power connections. Cargo in the port is generally handled by ships' tackle. Cranes to 230 tons and floating cranes to 30 tons are available. Many of the piers, wharves, and docks are available for winter mooring of vessels during the closed navigation season.

Facilities in East Basin:

Cleveland-Cuyahoga County Port Authority operates five wharves on the S side of East Basin that are owned by the city of Cleveland. The deck height at all these wharves is 10.4 feet. Four transit sheds provide 259,000 square feet of covered storage, and there is 14 acres of open storage. Cranes to 230 tons and forklifts to 31 tons are available.

Dock No. 32 E: (41°30'31"N., 81°41'54"W.); 712-

Structures across Cuyahoga River
**Miles above West Pierhead Light*
***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	Main River							
1	ConRail bridge	Railroad	0.76			250	8	Vertical lift. Clearance up 98 feet. Note 1.
	Junction with Old River		0.86					
2	Main Ave. Viaduct	Highway	1.01			218	92	Fixed. Vertical clearance 97 feet for 165-foot center width.
3	Baltimore & Ohio RR bridge	Railroad	1.28			229	8	Bascule.
4	Center St. bridge	Highway	1.39			113	17	Swing.
5	Detroit-Superior Viaduct	Highway	1.42			113	98	Fixed.
6	Union Terminal Viaduct	Railroad	1.89			200	98	Fixed.
7	Columbus Rd. bridge	Highway	1.93			220	17	Vertical lift. Clearance up 98 feet.
8	ConRail bridge	Railroad	2.24			200	8	Vertical lift. Clearance up 97 feet.
9	ConRail bridge	Railroad	2.42			200	23	Vertical lift. Clearance up 98 feet.
10	Carter Rd. bridge	Highway	2.43			201	22	Vertical lift. Clearance up 97 feet.
11	Eagle Ave. bridge	Highway	2.80			187	15	Vertical lift. Clearance up 97 feet.
12	Lorain-Carnegie Viaduct	Highway	3.14			178	96	Fixed.
13	ConRail bridge	Railroad	3.19			134	20	Bascule.
14	Norfolk & Western Ry. bridge	Railroad	3.34			200	64	Vertical lift. Clearance up 97 feet.
15	Inner Belt Freeway bridge	Highway	3.42			230	93	Fixed. Vertical clearance 97 feet for 199-foot center width.
16	W 3rd St. bridge	Highway	3.69			200	10	Vertical lift. Clearance up 97 feet.
17	Overhead cable	Power	3.71				124	
18	ConRail bridge	Railroad	4.33			117	29	Bascule.
19	Jefferson Ave. bridge	Highway	4.51			100		Superstructure removed.
20	Newburgh & South Shore Ry. bridge	Railroad	4.71			102	11	Bascule.
21	Overhead cable	Power	4.72				118	
22	Baltimore & Ohio RR bridge	Railroad	4.75			102	10	Bascule.
23	Overhead cable	Power	4.76				118	
	Junction with Turning Basin		4.91					
24	Overhead cable	Power	5.34				122	
25	Overhead conveyor		5.35			210	99	
26	Overhead pipeline		5.39			210	99	
27	River Terminal RR bridge	Railroad	5.42			129	15	Bascule.
29	Norfolk & Western Ry bridge	Railroad	5.47			200	28	Vertical lift. Clearance up 97 feet.
30	Overhead cable	Power	5.49				122	
31	Norfolk & Western Ry. bridge	Railroad	6.07			27	14	Fixed.
32	Overhead cable	Telephone	6.08					Data not available.
33	Newburgh & South Shore Ry. bridge	Railroad	6.09			59	14	Fixed.
34	Overhead cable		6.10				118	

Structures across Cuyahoga River (Continued)

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
	Main River (cont.)							
	Old River							
	Junction with Main River		0.86					
35	Baltimore & Ohio RR bridge	Railroad	0.89			170	6	Bascule.
36	Willow Ave. bridge	Highway	1.02			150	12	Vertical lift. Clearance up 98 feet.

See 33 CFR 117.1 through 117.49, chapter 2, for drawbridge regulations.

Bridges over Cuyahoga River will be closed to river traffic as follows: Carter Road and Eagle Avenue bridges, 0730 to 0800, 0815 to 0845, 1615 to 1645, and 1700 to 1730, provided that when these two bridges are opened between 0800 and 0815 and between 1645 and 1700 the opening shall be so timed as to permit a moving vessel to pass through both draws; Columbus Road and West Third Street, 0730 to 0800 and 1700 to 1730. The above hours are not applicable to Sundays, legal holidays, and Saturday afternoons, nor at times of emergency when fire tugs request the opening of any draw, nor when there is a swift current in the river.

Note 1.–The bridgetender monitors VHF-FM channel 16 (156.80 MHz) and works on channel 13 (156.65 MHz); call sign, KUF-618.

foot face; 27 feet alongside; receipt and shipment of general and containerized cargo, receipt of aluminum pigs, handling of steel products.

Dock Nos. 32 N, 30, 28 N: immediately W of Dock No. 32 E; 1,608-foot face; 30 to 27 feet alongside; receipt and shipment of general and containerized cargo, receipt of aluminum pigs, handling of steel products.

Dock No. 28 W: adjacent to Dock No. 28 N; 710-foot face; 28 to 26 feet alongside; receipt and shipment of general and containerized cargo, receipt of aluminum pigs, handling of steel products and heavy-lift items.

Dock No. 26: across slip W from Dock No. 28 W; 698-foot E face, 297-foot N face, 681-foot W face; 25 to 26 feet alongside; receipt and shipment of general and containerized cargo.

Dock No. 24: across slip W from Dock No. 26; 672-foot E face, 519-foot N face, 642-foot W face; 27 feet alongside; receipt and shipment of general and containerized cargo and steel products; receipt of fluorspar, bauxite, and newsprint.

Facilities in West Basin:

ConRail Ore Dock No. 11: (41°29'47"N., 81°43'23"W.); 1,875 feet of berthing space with dolphins; 30 to 24 feet alongside; deck height, 9 feet; four hulett-type ore unloaders, capacity 800 tons per hour each; 36,000-ton storage trough; open storage for 1 million tons of ore; receipt of iron ore and iron ore pellets; owned by ConRail and operated by Ohio and Western Pennsylvania Dock Co.

Facilities in Cuyahoga River below the junction with Old River:

Cleveland-Cuyahoga Port Authority Dock No. 20: E side of Cuyahoga River inside the entrance; 775-foot face; 27 feet alongside; deck height, 8 feet; front-end loader; open storage for 240,000 tons of material; receipt or iron ore pellets; owned by Cleveland-Cuyahoga County Port Authority and operated by Lake Erie Asphalt Products, Inc.

Ontario Stone Corp., Dock No. 1: (41°29'56"N., 81°42'34"W.); 500 feet of usable berthing space; 25 feet alongside; deck height, 8 feet; four mobile front-end loaders; open storage for 140,000 tons of limestone; receipt of limestone; owned and operated by Ontario Stone Corp.

Facilities in Old River:

United States Steel Corp., Sycamore Slip Wharf: S side of the river mouth; 240-foot face; 18 to 20 feet alongside; deck height, 6 feet; open storage for 10,000 tons of limestone; receipt of limestone; owned by United States Steel Corp. and operated by various operators.

Huron Cement Cleveland Terminal Wharf: (41°29'50"N., 81°42'32"W.); 415-foot face; 24 feet alongside; deck height, 7.8 feet; silo storage for 36,000 tons of cement; receipt of bulk cement; owned and operated by Cement Division, National Gypsum Co.

Ontario Stone Corp., Dock No. 3: W side of Old River opposite Nypando Dock; 600-foot face; 25 feet alongside; deck height, 8 feet; four front-end loaders available; open storage for 200,000 tons of material; receipt of limestone, manganese ore, and iron ore pellets; owned and operated by Ontario Stone Corp.

Sand Products Corp., Dock No. 1: N side of Old River 1,500 feet above Ontario Stone Corp., Dock No. 3; 1,000 feet of berthing space along natural bank; 20 to 25 feet alongside; one mobile front-end loader; silo storage for 1,000 tons of sand; receipt of sand; owned and operated by Sand Products Corp.

Ashland Petroleum Co. Wharf: E side of slip immediately W of Sand Products Corp., Dock No. 1; 195 feet of berthing space with dolphins; 20 feet alongside; deck height, 10 feet; tank storage for 382,000 barrels; receipt and shipment of petroleum products; owned and operated by Ashland Petroleum Co.

International Salt Co. Dock: W side of slip, opposite Ashland Petroleum Co. Wharf; 602-foot face; 18 to 24 feet alongside; deck height, 12 feet; fixed loading tower, capacity 3,300 tons per hour; storage tank, capacity 40,000 tons; shipment of graded dry bulk rock salt; owned and operated by International Salt Co.

Facilities in the Cuyahoga River above the junction with Old River:

Alpha Concrete Corp. Wharf: NE side of river opposite mouth of Old River; 300 feet of berthing space; 15 to 22 feet alongside; deck height, 6 feet; open storage for 5,000 tons of stone; receipt of stone; owned by Joseph Waters and operated by Alpha Concrete Corp.

Cereal Food Processors Dock: E side of river about 250 feet above Center Street bridge; 350-foot face; 22 to 18 feet alongside; deck height, 8 feet; grain unloading tower, capacity 8,000 bushels per hour; storage silos and bins for 500,000 bushels of grain; receipt of grain; owned and operated by Cereal Food Processors, Inc.

Cuyahoga Lime Co. Dock: E side of river about 700 feet above Cereal Food Processors Dock; 245-foot face; 20 to 25 feet alongside; deck height, 8 feet; one front-end loader; open storage for 80,000 tons of limestone; receipt of limestone; owned and operated by Cuyahoga Lime Co.

Medusa Cement Co., Cleveland Dock: W side of river 0.2 mile above Columbus Road bridge; 600-foot face; 20 to 23 feet alongside; deck height, 5 to 6 feet; silo storage for 8,000 tons of cement; receipt of bulk cement; owned and operated by Medusa Cement Co.

Alpert Bros. Leasing Co. Lower Dock: E side of river 0.2 mile above Columbus Road bridge; 895-foot face; 18 to 24 feet alongside; deck height, 10 feet; 35-ton mobile hoist; 3 acres open storage; receipt of sand and stone; owned by Alpert Bros. Leasing, Inc. and operated by Alpha Precast Corp.

Mid-Continent Coal and Coke Wharf: E side of river between Eagle Avenue bridge and Lorain Carnegie Viaduct; 1,000-foot face N end, 550-foot face S end; 8 feet alongside; deck heights, 6 to 9 feet; coke breeze loading tower at S end, capacity 400 tons per hour; open storage for 20,000 tons of coke breeze; shipment of coke breeze; owned by city of Cleveland and Mid-Continent Coal and Coke, and operated by Mid-Continent Coal and Coke.

Ford Motor Co. Dock: E side of river above Mid-Continent Coal and Coke Wharf; 630 feet of berthing space; 19 to 23 feet alongside; deck height, 8 to 10 feet; one front-end loader; open storage for 780,000 tons of limestone; receipt of limestone and iron ore pellets; owned and operated by Ford Motor Co.

Cleveland Builders Supply Co., Dock No. 2: N side of river immediately E of Inner Belt Freeway bridge; 1,680 feet of berthing space; 24 feet alongside; deck height, 6 to 8 feet; open storage for 185,000 tons of material; receipt of sand, limestone, and other bulk materials; owned and operated by Cleveland Builders Supply Co.

Cleveland Builders Supply Co., Dock No. 4: SE side of the river between Inner Belt Freeway bridge and W 3rd Street bridge; 763 feet of berthing space, 23 to 18 feet alongside, deck heights, 6 and 7 feet; open storage for 40,000 tons of material; receipt of bulk materials and fuel oils; owned and operated by Cleveland Builders Supply Co.

Cleveland Builders Supply Co., "F" Mill Dock: SE side of the river immediately below W 3rd Street bridge; 422-foot face; 10 to 22 feet alongside; deck height, 8 feet; receipt of sand; owned and operated by Cleveland Builders Supply Co.

Ontario Stone Corp., Dock No. 2: NW side of river immediately above W 3rd Street bridge; 565 feet of berthing space; 22 feet alongside; deck height, 8 feet; open storage for 100,000 tons of limestone; receipt of limestone; owned by United Garage and Service Corp. and operated by Ontario Stone Corp.

Clifton Concrete and Supply Co. Wharf: W side of the river immediately below ConRail bridge at Mile 4.3; 693-foot face; 23 to 18 feet alongside; deck height, 8 feet; open storage for 43,000 tons of stone and sand; receipt of stone and sand; owned by Mobil Oil Corp. and operated by Clifton Concrete and Supply Co.

Cleveland Builders Supply Co., Dock No. 1: W side of the river above the Jefferson Avenue bridge; 480-foot face; 20 to 19 feet alongside; deck height, 8 to 9 feet; one front-end loader; open storage for 70,000 tons of sand and stone; receipt of sand and stone; owned and operated by Cleveland Builders Supply Co.

Koppers Dock: W side of the river above Cleveland Builders Supply Co., Dock No. 1; 120 feet of berthing space with dolphins; 19 feet alongside; deck height, 5 feet; storage tanks, capacity 59,000 barrels; receipt of asphalt; owned and operated by Koppers Co., Inc.

C-I-L Chemicals Wharf: W side of the river immediately above Koppers Dock; 340 feet of berthing space; 10 to 20 feet alongside; deck height, 8 to 9 feet; storage tanks for 10,000 tons of sulfuric acid; receipt of sulfuric acid; owned and operated by C.I.L. Chemicals, Inc.

Marine Fueling Wharf: E side of river immediately below Baltimore and Ohio Railroad bridge; 535 feet of berthing space; 20 to 22 feet alongside; deck height, 10 feet to piling, 11½ feet to ground; tank storage for 108,000 barrels; receipt of petroleum products; owned and operated by Marine Fueling, Division of Reiss Oil Terminal Corp.

Republic Steel Corp., Cleveland District, West Side Dock: W side of the river between Baltimore and Ohio Railroad bridge and River Terminal RR bridge; 2,054 feet of berthing space; 10 to 23 feet alongside; deck height, 10.7 feet; two traveling bridge cranes; open storage for 35,000 tons of limestone and 750,000 tons of iron ore pellets; receipt of iron ore pellets and limestone; shipment of steel products; owned and operated by Republic Steel Corp., Cleveland District.

Republic Steel Corp., Cleveland District, Lower Dock, East Side: E side of the river below the Clark Avenue Viaduct; 2,566 feet of berthing space; 23 to 17 feet alongside; deck height, 10.7 feet; open storage for 74,000 tons of material; receipt of limestone and dolomite; shipment of steel products; owned and operated by Republic Steel Corp., Cleveland District.

Jones and Laughlin Steel Corp., Cleveland Works Wharf: NW side of the river above the Clark Avenue Viaduct; NE section, 1,780-foot face; SW section, 1,000-foot face; 23 to 19 feet alongside; deck height, 9½ feet; open storage for 1 million tons of material; storage tanks, capacity, 238,000 barrels; receipt of limestone, ferrous scrap, iron ore pellets, and fuel oil; shipment of steel products; owned and operated by Jones and Laughlin Steel Corp.

Republic Steel Corp., Cleveland District, Fuel Oil Dock: SE side of the river above the Clark Avenue Viaduct; 1,150-foot face; 20 feet alongside; deck heights, 12 feet and 8 to 12 feet; storage tank, capacity 285,000 barrels; receipt of fuel oils; owned and operated by Republic Steel Corp., Cleveland District.

Republic Steel Corp., Cleveland District, Upper Dock: adjacent above Republic Steel Corp., Cleveland District Dock; 1,250 feet of berthing space; 23 to 20 feet alongside; deck height, 10 feet; open storage for 674,000 tons of iron ore pellets; receipt of iron ore pellets; owned and operated by Republic Steel Corp., Cleveland District.

Supplies.–All types of marine supplies and provisions are available at Cleveland. Vessels normally receive bunker and diesel fuels at their berths from self-propelled vessels.

Foreign-Trade Zone No. 40 is in Cleveland. (See chapter 1, Foreign-Trade Zones, and appendix for address.)

Repairs.–The Halvorsen Boiler and Engineering Company maintains portable equipment for making repairs to vessels at their berths and a machine shop capable of producing shafts 16 feet by 14 inches. G and W Industries, Inc. has a berth on the S side of the river above the Carter Road bridge with a 60-ton crane and floating cranes to 35 tons. They produce shafts up to 12 feet by 36 inches. The above repair companies are on the Cuyahoga River and provide all types of above-the-waterline repairs to vessels in Cleveland harbor.

Great Lakes Towing Company's facility is in Old River and has a 250-ton floating drydock, a heavy lift crane, and complete machinery facilities for above and below-waterline repairs of all types.

Small-craft facilities.–Several marinas on the lakefront provide transient berths, gasoline, diesel fuel, water, ice, electricity, launching ramps, and sewage pump-out. Hoists to 40 tons can handle 65-foot vessels for hull, engine, and electronic repairs. A boatyard at the upper end of Old River has a travellift and crane with capacities to 20 tons, and can make small-craft repairs of all kinds. Marine supplies and provisions are available in the city and at several marine supply companies on the Cuyahoga River.

Communications.–Cleveland is a major transportation terminus. The city is served by several rail lines and has excellent highway connections. Major international and domestic airlines serve Cleveland-Hopkins International Airport in the SW part of the city and Burke Lakefront Airport on the S side of the outer harbor.

Charts 14826, 14829.–W from Cleveland, the shore consists of 10- to 20-foot-high bluffs and sandy beaches, and the shoreline trends generally W to **Avon Point** (41°30.9′N., 82°00.8′W.), a broad rounding point projecting somewhat to N about 15 miles from the Cleveland entrance. From Avon Point to Lorain, about 10 miles SW, the bluffs are smaller. Between Cleveland and Lorain, deep water is no more than 1.2 miles offshore except just E of Lorain where detached shoal spots extend 3 miles into the lake. An artificial reef marked by private buoys is about 0.6 mile offshore 2.6 miles ENE from the mouth of Rocky River. A wreck, covered 30 feet, is 4.3 miles NNE of Avon Point.

Rocky River Harbor is at the mouth of the **Rocky River,** about 6.5 miles W of Cleveland Harbor entrance, at the city of **Lakewood, Ohio.**

Two unmarked **dumping grounds** with least reported depths of 35 feet are 1.3 and 3.6 miles N of the mouth of Rocky River.

Channels.–The harbor is entered from Lake Erie through a dredged entrance channel on the SW side of a pier that extends lakeward from the E side of the mouth of Rocky River. Lights mark the outer and inner ends of the pier. The dredged channel extends upstream for 0.9 mile above the mouth. An anchorage basin is on the SW side of the channel just inside the mouth of the river. In November 1984, the controlling depth was 4½ feet to the anchorage basin with 4 to 7 feet in the basin, thence 3 feet at midchannel to Detroit Road highway bridge with 2 feet to bare in the turning basin just above the bridge.

Bridges.–Three fixed bridges with a least clearance of 49 feet cross the navigable portion of Rocky River. The Clifton-Westlake highway bridge, the Norfolk and Western Railway bridge, and the Detroit Road highway bridge are 0.4, 0.5, and 0.7 mile above the mouth, respectively. Overhead power cables with a minimum clearance of 49 feet are just below the railroad bridge and just below the Detroit Road bridge.

Harbor regulations have been established by the city of Lakewood. The Department of Public Safety enforces a 6 mph (5.2 knots) **speed limit.** Copies of the regulations may be obtained from the Department of Public Safety.

Small-craft facilities.–Most of the facilities in the harbor are private. However, limited transient berths, gasoline, water, electricity, a launching ramp, and marine supplies are available. Hoists to 6 tons are available for hull and engine repairs.

About 2.2 miles WSW of Avon Point, a private light marks the outer end of the breakwaters protecting the intake channel of the Cleveland Electric Illuminating Co. A wreck, covered 6 feet, is close N of the light.

Charts 14826, 14829, 14841.–**Lorain Harbor**, serving the city of **Lorain, Ohio**, is about 25 miles W of Cleveland Harbor. It comprises the lower 3 miles of the **Black River** and an outer harbor.

An unmarked **dumping ground** with a least reported depth of 35 feet is centered about 3.5 miles N of the harbor entrance.

Prominent features.–The coal docks on the W side of the mouth of Black River and the stacks of the powerplant 0.3 mile SW of the mouth are prominent.

Lorain Harbor Light (41°28.9'N., 82°11.7'W.), 60 feet above the water, is shown from a white tower on the W end of the detached breakwater on the N side of the entrance channel. A fog signal is at the light.

Channels.–The harbor is entered through a dredged entrance channel that leads ESE from the deep water in Lake Erie on the S side of a detached breakwater, and then leads SE between converging breakwaters to the mouth of Black River. The mouth of the river is entered between parallel piers, and the dredged channel leads upstream for about 2.8 miles. Turning basins are 1.6 miles above the mouth and at the head of the project. In the outer harbor, basins are on either side of the entrance channel. From the S side of the outer harbor W basin, an approach channel leads SE to the municipal pier 0.2 mile W of the mouth of the river. Lights mark the ends of the breakwaters and the piers at the river mouth. Buoys mark the E limit of the dredged basin in the outer harbor.

In March-August 1982, the midchannel controlling depths were 27 feet from deep water in the lake to the lakeward end of the converging breakwaters, thence 25 feet to the Norfolk and Western railway bridge, thence 24 feet to the upstream Federal project limit, thence 12 to 19 feet in the lower turning basin and 12 to 20 feet in the upper turning basins except for lesser depths along the edges. The basins in the outer harbor had depths of 17 to 25 feet except for lesser depths along the edges.

A semicircular diked disposal area is on the NE side of the E breakwater. A floating breakwater extends about 600 feet at right angles from the SW side of the same breakwater.

Dangers.–Several detached shoals are in the approach to Lorain Harbor. A shoal with least depths of 22 feet extends 1.4 miles from shore within 2 miles E of the harbor entrance. Several shoal spots with depths of 24 to 28 feet are from 1.4 to 2.4 miles N of Lorain Harbor Light.

Bridges.–Erie Avenue bridge, about 0.6 mile above the mouth of Black River, has a bascule span with a clearance of 33 feet at the center. Norfolk and Western Railway bridge, 1.2 miles above the mouth, has a vertical lift span with clearances of 35 feet down and 123 feet up. The 21st Street bridge, 2 miles above the mouth, has a fixed span with a clearance of 97 feet. An overhead power cable on the E side of the bridge has a clearance of 120 feet. (See **33 CFR 117.1 through 117.49**, chapter 2, for drawbridge regulations.)

Towage.–Tugs for Lorain are available from Cleveland. (See Towage under Cleveland.)

Lorain is a **customs station.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard.–Lorain Coast Guard Station is on the E side of the Black River just inside the mouth.

Harbor regulations.–A **speed limit** of 6 mph (5.2 knots) is enforced in the harbor except in the outer harbor where it is 10 mph (8.7 knots). (See **33 CFR 162.160 and 207.570**, chapter 2, for regulations.)

Local harbor regulations are established by the Lorain Port Authority and enforced by the **harbormaster**, who can be reached at the Department of Public Service or through the Lorain Port Authority, City Hall, Lorain, Ohio 44052. Copies of the regulations can be obtained from the harbormaster or the Port Authority.

Wharves.–Lorain has piers and wharves in the SW part of the outer harbor and along both sides of the Black River. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For the latest depths, contact the operator.) All the facilities described have highway connections. Many have railroad, water, and electrical shore-power connections. Special cargo handling equipment is described under the individual facilities. Special arrangements can be made with the American Ship Building Company for the use of their 80-ton shearleg derrick. Many of the facilities are used for mooring vessels during the closed navigation season.

Republic Steel Corp. Lorain Pellet Terminal Mooring Basin: 0.1 mile W of Black River; NE face 1,090 feet berthing space; 20 to 23 feet alongside; SW face 1,095 feet berthing space; 25 feet alongside; deck height, 8 feet; mooring of vessels awaiting berth at Republic Steel Corp. Lorain Pellet Terminal Wharf; owned and operated by Republic Steel Corp.

Republic Steel Corp. Lorain Pellet Terminal Wharf: W side of the river 0.2 mile above the outer end of the W pier; 2,200 feet of berthing space; 27 feet alongside; deck height, 8 feet; open storage for 532,000 tons of ore; receipt and shipment of iron ore pellets; owned and operated by Republic Steel Corp.

Erie Sand and Gravel Co., Lorain Dock: W side of the river below the Norfolk and Western Railway bridge; 460 feet of berthing space; 21 to 27 feet alongside; deck height, 6½ to 8 feet; two front-end loaders and crawler crane; receipt of sand and stone; owned and operated by Erie Sand and Gravel Co.

United States Steel Corp., Lorain-Cuyahoga Works, Slag Dock: W side of the river 0.3 mile above the 21st Street bridge; 220 feet of berthing space with dolphins; 20 feet alongside; front-end loaders; open storage for 30,000 tons of material; receipt of miscellaneous dry bulk cargo and occasional shipment of crushed slag and coke breeze; owned and operated by United States Steel Corp.

United States Steel Corp., Lorain Works, Ore Dock: SW side of the river 0.6 mile above the 21st Street bridge; 2,490-foot face; 26 feet alongside; deck height, 10½ feet; three 20-ton hulett-type ore unloaders with rate of 650 tons per hour each feed conveyor system; open storage for 3 million tons of iron ore and 310,000 tons of limestone; receipt of iron ore and limestone; owned and operated by United States Steel Corp.

Griffith Blacktop Dock No. 1: NW side of the turning basin at the head of the Federal project and E side of the river just below the basin; 450-foot E face along natural bank, 27 feet alongside; 400-foot W face along natural bank, 27 feet alongside; deck height, 6 feet; open storage for 75,000 tons of material; receipt of crushed stone and sand; owned by United States Steel Corp. and Griffith Blacktop, Inc. and operated by Griffith Blacktop, Inc.

Gold Bond Building Products, Lorain Plant Wharf: E side of the river about 0.3 mile above the 21st Street bridge; 750 feet of berthing space with dolphins; 20 feet alongside; deck height, 7 feet; open storage for 120,000 of gypsum rock; receipt of gypsum rock; owned and operated by Gold Bond Building Products, Division of National Gypsum Co.

Allied Oil Co., Lorain Dock: N side of river just above 21st Street bridge; 450 feet of berthing space with shore moorings; 23 feet alongside; deck height, 12 feet; 500,000-barrel storage capacity; receipt of fuel oil; owned and operated by Allied Oil Co.

Griffith Blacktop Dock No. 2: N and E side of the river below the 21st Street bridge; 200 feet berthing space with platforms; 27 feet alongside; deck height, about 6 feet; 150-ton crawler crane; shipment of pig iron and steel products; receipt of sand; owned by Norfolk and Western Railway Co. and operated by Griffith Blacktop, Inc.

Adams Dock: E side of river 0.2 mile above the Norfolk and Western Railway bridge; 300 feet berthing space with dolphins; 27 feet alongside; deck height, 5 feet; covered storage for 10,000 tons of bulk material, open storage for 12,000 tons material; receipt of sand and crushed stone, occasional receipt of miscellaneous bulk materials; owned by Carl M. Adams and operated by North Ridge Trucking Co.

Terminal Ready-Mix Dock: N side of the river above the Norfolk and Western Railway bridge; 150-foot face; 500-foot natural bank; 10 to 25 feet alongside; deck height, 5 feet; open storage for 50,000 tons of sand and stone; receipt of sand and stone; owned by Sam Falbo and operated by Terminal Ready-Mix, Inc.

Supplies.–Bunker C oil is available by tank barge, and diesel oil is available by truck from local companies. Provisions and marine supplies are available on the N side of the Black River just E of the Erie Avenue bridge.

Small-craft facilities.–Marinas in Lorain Harbor are in the outer harbor SW of the river mouth, on the NE side of the river just inside the mouth, and on the W side of the river about 1 mile above the mouth. Gasoline, diesel fuel, water, ice, sewage pump-out facilities, and some marine supplies are available. A 30-ton fixed lift can handle 50-foot boats for hull repairs at the marina 1 mile above the river mouth. Engine repairs are made at a boatyard on the NE side of the river 0.6 mile above the mouth. A 25-ton fixed lift is available.

Communications.–Lorain has highway connections and is served by three major rail lines, ConRail, Norfolk and Western, and Baltimore and Ohio. Lorain County Airport is S of the city.

Charts 14826, 14829.–From Lorain, the shoreline trends SW for about 4 miles to Beaver Creek, thence 6 miles W to Vermilion. Throughout this stretch, deep water is about 0.9 mile offshore.

Beaver Creek, about 4 miles SW of Lorain Harbor, has a small-craft harbor and summer resort at the mouth. In 1967, the channel through the mouth was about 50 feet wide with depths of 3 to 4 feet; in May 1983, shoaling to 1 foot was reported in the channel. A bar that forms across the entrance reportedly washes out during the spring and after some storms, and restricts the harbor to small craft with shallow drafts. The E side of the entrance is protected by a pier that is marked by a private light near its outer end. A private 124° lighted range marks the entrance. The fixed bridges and cables that cross the creek about 0.3 mile above the mouth have a minimum clearance of 9 feet. Several other overhead cables with unknown clearances cross the creek and the marina slips upstream. This harbor is within the legal boundary of the city of Lorain, and the local harbor regulations of Lorain apply.

A marina inside the mouth of the creek has transient berths, gasoline, diesel fuel by truck, water, electricity, and a 12-ton hoist. For craft that can navigate under the bridges, three marinas upstream additionally provide gasoline, ice, marine supplies, launching ramps, and engine repairs.

Charts 14826, 14830.–Vermilion, about 34 miles W of Cleveland, has a harbor used mainly by fishing and recreational craft. The harbor comprises the lower 3,000 feet of the **Vermilion River**, and an approach channel from the lake. About 0.6 mile SE of the river entrance, a lighted tank with the name VERMILION on the side is prominent.

An unmarked **dumping ground** with a least reported depth of 32 feet is about 2.3 miles N of the entrance to Vermilion River.

Channels.–The approach to the river from Lake

Erie is through two dredged channels that lead around either end of a detached breakwater, join, and lead S between two piers at the mouth of the river. The channel leads upstream for about 0.6 mile to the Liberty Avenue bridge. Lights mark the ends and center of the breakwater and the ends of the piers.

In July 1985, the controlling depth was 4½ feet through the W approach channel to the mouth of the river, and 10 feet in the E approach channel to the mouth of the river, thence 10 feet to the junction with Superior Lagoon, thence 5 feet on the centerline to the Liberty Avenue bridge.

Dangers.–Just S of the dumping ground, several fish net stakes are in about 32 feet of water. A 6-foot shoal, is about 0.4 mile W of the W approach channel.

Bridges.–The Liberty Avenue bridge, 0.7 mile above the pierheads, has a fixed span with a clearance of 12 feet. The ConRail bridge 0.1 mile upstream has a fixed span with a clearance of 21 feet. The Norfolk and Western Railway bridge, 1 mile above the pierheads, has a fixed span with a clearance of 14 feet. Several overhead cables with unknown clearances cross the river in the vicinity of these bridges.

Harbor Regulations.–A **speed limit** of 6 mph (5.2 knots) is enforced in the harbor. (See **33 CFR 162.160 and 207.565,** chapter 2, for regulations.)

Small-craft facilities.–The Kishman Fish Co. operates a 450-foot wharf on the W side of the river 0.4 mile above the entrance. There are depths of 9 to 15 feet reported alongside and a deck height of 5 feet.

Several marinas in the lower 1.2 miles of the river provide transient berths, gasoline, diesel fuel, water, ice, electricity, launching ramps, and marine supplies. Hoists to 20 tons are available at several boatyards in the river for hull and engine repairs.

Chart 14830.–From Vermilion, the shoreline extends SW for about 7.3 miles to the southernmost point of Lake Erie. Along this stretch, rocky shallows extend 1 mile offshore with deep water as much as 1.5 miles off. Thence NW for 3.4 miles to Huron Harbor, deep water is about 1 mile offshore except just E of Huron Harbor. An unmarked 13-foot spot is near the outer end of a shoal that extends 1.5 miles into the lake ENE of the Huron Harbor entrance channel.

Charts 14830, 14843.–Huron Harbor is about 44 miles W of Cleveland inside the mouth of the **Huron River** at the city of **Huron, Ohio.**

Grain, iron ore, and limestone are the principal commodities handled at the port.

An unmarked **dumping ground** with a least reported depth of 35 feet is 3 miles N of the entrance to Huron Harbor.

Prominent features.–The stacks of the Huron Lime Co. on the E side of the river mouth are prominent.

Huron Harbor Light (41°24.3'N., 82°32.6'W.), 80 feet above the water, is shown from a white square pyramidal tower on the W pierhead. A fog signal and a radiobeacon are at the light.

Channels.–The harbor is entered through a dredged channel that leads SW from deep water in Lake Erie between a pier and an adjacent disposal area on the NW side, and a breakwater on the SE side to the mouth of the Huron River. The channel leads into the river to a turning basin with its upper end about 0.4 mile above the mouth. Buoys mark the entrance channel, and lights mark the outer end of the pier and breakwater and each side of the river mouth. Federal project depths are 29 feet in the entrance channel to the inner end of the W pier, thence 28 feet to the turning basin, thence 27 feet in the E half of the basin and 21 feet in the W half of the basin. (See Notice to Mariners and latest editions of charts for controlling depths.) Huron River is navigable by small craft for about 10 miles above the mouth.

A semicircular diked disposal area is on the W side of the W pier.

Dangers.–An extensive area of fish net stakes is off the entrance to Huron Harbor.

Towage.–Tugs for Huron are available from Cleveland. (See Towage under Cleveland.)

Huron is within the Sandusky **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Harbor Regulations.–A **speed limit** of 6 mph (5.2 knots) is enforced in the harbor except in the outer harbor where the speed limit is 10 mph (8.7 knots). (See **33 CFR 162.155 and 207.570,** chapter 2, for regulations.)

Local harbor regulations are established by the city of Huron and enforced by local law enforcement officials. Copies of the regulations may be obtained from the City Manager, Municipal Building, Huron, Ohio 44839.

Wharves.–Huron Harbor has deep-draft facilities on the E side of the Huron River and in the two slips that extend SE just inside the mouth of the river. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For the latest depths, contact the operator.) The facilities described have highway and rail connections. The Norfolk and Western Railway Co., Ore Dock has water connections. During the closed navigation season, vessels moor in Slip No. 1. Special arrangements can be made for electrical connections.

The Pillsbury Co., Grain Elevator Wharf: W side of Slip No. 2; 832-foot face; 27 feet alongside; deck height, 10½ feet at center and 6½ feet at ends; 1¾-million-bushel grain elevator; fixed tower equipped with a marine leg, and a loading spout, capacity

Structures across Huron River
**Miles above Huron Harbor Inner Light*
***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
1	Overhead cables	Power	0.72				70	
2	Cleveland Rd. E. bridge	Highway	0.73			86	21	Fixed.
3	Overhead cable		0.73				52	
4	Overhead cable	Power	0.77				50	
5	ConRail bridge	Railroad	0.79	57	57		19	Fixed.
6	Overhead cable	Power	0.79				50	
7	Mason Rd. bridge	Highway	6.56			115	13	Fixed.
8	Fries Landing bridge	Highway	7.70			149		Bridge removed. Abutments remain.
9	Norfolk & Western Ry. bridge	Railroad	7.90	102	99		35	Fixed.
10	Ohio Turnpike bridges	Highway	8.80			80	30	Twin fixed.

25,000 bushels per hour; shipment of grain; owned and operated by The Pillsbury Co.

Lake Erie Dock Co., Ore Dock: E side of Slip No. 2; 1,400-foot face; 27 to 26 feet alongside; deck height, 8 feet; two 17-ton hulett-type ore unloaders, capacity 1,700 tons per hour; open storage for 150,000 tons of ore; receipt of iron ore; owned by Norfolk and Western Railway Co. and operated by Lake Erie Dock Co.

Huron Lime Co., Stone Dock: E side of the river mouth and the outer E side of Slip No. 1; total of 1,100 feet of berthing space; 28 to 24 feet alongside channel face, 24 to 16 feet alongside curved section, 16 to 17 feet along E side of Slip No. 1; deck height, 8 feet; one front-end loader; open storage for 120,000 tons of limestone; silos for 1,800 tons of lime; receipt of limestone; owned by Norfolk and Western Railway Co. and operated by Huron Lime Co.

Supplies.–Marine supplies are available in the city. Diesel fuel and provisions are available by truck from Sandusky.

Small-craft facilities.–Numerous small-craft facilities are on the W side of the lower mile of the Huron River. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, and launching ramps are available. Lifts to 20 tons are available for hull, engine, and electronic repairs.

Communications.–Huron has highway connections and is served by ConRail and Norfolk and Western Railway.

Chart 14830.–From Huron, the wooded shoreline trends NW for 9.7 miles to **Cedar Point** (41°29.5'N., 82°41.3'W.), the SE entrance point to Sandusky Bay. In this stretch, deep water is about 0.9 to 1.2 miles off except at Cedar Point where the shallow depths widen to 1.5 miles.

Charts 14830, 14844, 14842, 14845.–Sandusky Harbor, serving the city of **Sandusky, Ohio,** is in the SE part of Sandusky Bay about 50 miles W of Cleveland. The harbor is a major shipping point for coal. Sand, gypsum, and fish are also handled. The harbor is an excellent natural harbor of refuge for small craft.

An unmarked **dumping ground** with a least reported depth of 30 feet is 2.7 miles N of Sandusky Harbor entrance channel.

Prominent features.–A large amusement park on Cedar Point, brightly lighted at night, is conspicuous. The most prominent object in the park is the 330-foot observation tower on the E side of Cedar Point, 0.9 mile from the N extremity. The Erie County Courthouse lighted clock tower in the city is also prominent.

Sandusky Harbor Pierhead Light (41°30.0'N., 82°40.5'W.), 66 feet above the water, is shown from a white skeleton tower with an enclosed top on the outer end of the jetty that extends NE from Cedar Point. A fog signal is at the light.

Channels.–The harbor is entered from Lake Erie through a dredged entrance channel that leads SW from deep water in the lake along the NW side of a jetty extending NE from Cedar Point. Inside Cedar Point, the channel turns SSW across Sandusky Bay. About midway across the bay, the channel divides with the deeper channel leading W then S along a deep-draft wharf to a turning basin at the SW corner of the harbor. The shallower channel continues SSW to a channel leading W along the Sandusky docks to the turning basin.

The dredged channels are marked by lighted and unlighted buoys and lighted ranges. The lighted clock tower of the Erie County Courthouse is prominent on the line of **017°** Inner Range which marks Upper and Lower Straight Channels. A radiobeacon is on the NW side of Cedar Point.

Federal project depths are 26 feet in Moseley Channel, 25 feet in the Upper Straight Channel and

Upper Bay Channel, 24 feet in Lower Bay Channel and the turning basin, 22 feet in Dock Channel, and 21 feet in Lower Straight Channel. (See Notice to Mariners and latest edition of charts for controlling depths.)

It is the recommendation of the Lake Carriers' Association that, at the junction of the straight channel and the bay channel, the master of an outbound vessel should slow down if necessary to avoid meeting vessels at the intersection. This recommendation should not be construed as relieving the inbound vessel of the obligation to exercise due caution in approaching the intersection.

Anchorages.–A special anchorage is in a basin on the E side of Sandusky Bay about 1.3 miles SE of the entrance. (See **33 CFR 110.1 and 110.83a,** chapter 2, for limits and regulations.)

Dangers.–In 1977, it was reported that the jetty extending NE from Cedar Point is partially submerged during periodic high water conditions.

Caution.–A submarine cable crosses the inner end of Moseley Channel; vessels are cautioned not to drag anchor in this area.

Fluctuations of water level.–In addition to the fluctuations of level that affect Lake Erie somewhat uniformly, strong winds produce abnormal fluctuations in Sandusky Bay. In combination with prevailing high or low water, these abnormal fluctuations may reach a maximum effect of 6 feet above or 2½ feet below Low Water Datum.

Towage.–Tugs for Sandusky are available from Cleveland or Toledo. (See Towage under Cleveland and Toledo.)

Sandusky is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard.–Search and rescue functions for Sandusky Harbor are handled by Marblehead Coast Guard Station, 4 miles NW of Cedar Point.

Harbor Regulations.–A **speed limit** of 10 mph (8.7 knots) is enforced in Sandusky Harbor. (See **33 CFR 162.155 and 207.560,** chapter 2, for regulations.)

Wharves.–Sandusky has numerous waterfront facilities along the S side of the harbor, but only a few deep-draft facilities. (For a complete description of the port facilities, refer to Port Series No. 42, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. (For latest depths, contact the operator.) Rail, highway, water, and electrical shore-power connections are available at the berths except at the Erie Sand and Gravel Co., Salt Dock where only highway connections are available.

Erie Sand and Gravel Co. Dock: (41°27'24"N., 82°43'15"W.); 188-foot face; 14 to 12 feet alongside; deck height, 6 feet; open storage for 30,000 tons of materials; crawler crane for unloading sand; deep-draft vessels discharge by boom from Dock Channel; receipt of sand, salt, and gypsum; owned and operated by Erie Sand and Gravel Co.

Erie Sand and Gravel Co., Salt Dock: 450 feet W of Erie Sand and Gravel Co. Dock; 150-foot face; 16 to 0 feet alongside; deck height, 3 feet; open storage for 160,000 tons of salt; deep-draft vessels discharge by boom from Dock Channel; receipt of salt; owned by Great Lakes Dock and Dredge Co. and operated by Erie Sand and Gravel Co.

Lower Lake Dock Co., Pier No. 3: (41°27'32"N., 82°43'55"W.); 3,495-foot E side; 25 feet alongside; deck height, 12 feet; open storage for 850,000 tons of coal; one fixed car dumper with chute for loading vessels; winter mooring; shipment of coal; owned by Norfolk and Western Railway Co. and operated by Lower Lake Dock Co.

Supplies.–Deep-draft vessels do not normally obtain provisions at Sandusky. Vessels are supplied with bunker coal at Lower Lake Dock Co., Pier No. 3.

Small-craft facilities.–Sandusky Harbor has several marinas, the largest on the W side of Cedar Point. In 1977, the reported controlling depth in the entrance and basin of this marina was 11 feet. However, there are lesser depths in the approach to the marina. Gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, hull, engine and electronic repairs, a 50-ton travel lift, and a launching ramp are available. Other facilities are along the S side of Sandusky Harbor. A small-craft basin is behind the ConRail fill 0.75 mile ENE of the courthouse clock tower.

In the SE part of Sandusky Bay, a privately dredged and marked channel leads to a marina under construction in Pipe Creek. In 1983, the channel had a reported controlling depth of 3 feet. The highway bridge over the channel entrance has a 38-foot fixed span with a clearance of 21 feet. The channel is bordered on the W side by diked wetland areas.

Communications.–Sandusky has good highway connections and is served by the Norfolk and Western Railroad and ConRail. A small airport is SE of the city. Three ferry services connect Sandusky with Cedar Point; Kelleys Island; and Pelee Island, Kingsville, Ont., and Leamington, Ont.

Charts 14830, 14844, 14842.–Sandusky Bay extends W from its entrance between Cedar Point and Bay Point for about 15 miles to **Muddy Creek Bay. Sandusky River** flows into the S side of Muddy Creek Bay. Small craft can navigate through Sandusky Bay, Muddy Creek Bay, and upstream in the Sandusky River for about 15 miles to the Norfolk and Western Railway Bridge at the town of **Fremont, Ohio.** Depths of about 5 feet can be carried through Sandusky Bay, thence 2 to 4 feet through Muddy Creek Bay, and thence 2 to 19 feet in the river. The channels through the bays are indefinite and not marked. The entrances to Muddy Creek Bay and the Sandusky River are marked by uncharted buoys that are frequently moved to mark the best water. Small craft are cautioned to use the marked channel at the mouth of the river as submerged dikes extend from both sides of the river mouth.

In May 1985, a submerged obstruction was reported in the midchannel at the mouth of the river in about 41°27'01"N., 82°59'57"W.

From **Martin Point,** about midlength of the S shore of Sandusky Bay, three bridges cross to **Danbury, Ohio** on the N shore. The easternmost is the ConRail bridge. The main draw of the bridge is a bascule span with a clearance of 9 feet, and three fixed spans have a maximum clearance of 8½ feet. The bridge has been filled solid in various places, causing strong currents to flow through the openings; caution is advised. Caution is also advised because of piles that bare near the bridge. An overhead power cable W of the ConRail bridge has a clearance of 62 feet through the main navigation opening, which is marked by lights, and 32 feet through the other openings. The center bridge is the Ohio Route 269 highway bridge, a vertical lift span with clearances of 11 feet down and 66 feet up. In May 1985, the bridge was being kept in an open position due to deteriorated support piers; vessels are advised to navigate through the draw spans of the bridge only and not the openings under the rest of the bridge. The westernmost bridge is the Ohio Route 2 highway bridge, a fixed span with a clearance of 43 feet. (See **33 CFR 117.1 through 117.59 and 117.853,** chapter 2, for drawbridge regulations.)

The Ohio Turnpike I-80 and I-90 Bridge crossing the Sandusky River about 9 miles above the mouth has twin fixed spans with clearances of 40 feet. The Ohio Route 20 bridge about 13.5 miles above the mouth has a fixed span with a clearance of 53 feet. The Norfolk and Western Railway bridges that cross the river on either side of Bradys Island at the head of navigation at Fremont have fixed spans with clearances of 24 feet. Overhead cables crossing the navigable part of the river have a minimum clearance of 36 feet.

A submerged breakwater off the S shore of Sandusky Bay 3.6 miles SW of Martin Point is marked by private lighted buoys. A sunken wreck, covered ½ foot, is off the N shore of the bay 3.9 miles WNW of Martin Point.

Johnson Island, in the NE corner of Sandusky Bay W of Bay Point, is connected to the N shore of the bay by a causeway having five openings. Each opening has a horizontal clearance of 50 feet with the center opening having a vertical clearance of 29 feet and each of the others 8 feet.

From the Sandusky Harbor entrance channel N to Point Marblehead, there are several offlying shoal spots. **Bay Point Shoal,** with a least depth of 4 feet, is 1 mile E of Bay Point and is marked on the E side by a lighted buoy. A submerged rock is close to shore in about 41°31'13"N., 82°43'02"W. Shoal spots with depths of 22 to 24 feet are from 1.5 to 3 miles E of Point Marblehead and 1.7 to 2.7 miles N of Sandusky Pierhead Light.

An unmarked **dumping ground** with a least reported depth of 30 feet is 3 miles E of Point Marblehead. Between Point Marblehead and the dumping ground, S to the Sandusky Bay entrance, are numerous submerged fish net stakes.

Point Marblehead (41°32.2'N., 82°42.7'W.), marked by a light, is the E extremity of the peninsula that encloses the N side of Sandusky Bay.

About 1 mile WNW of Point Marblehead are the Marblehead Stone Docks, two piers owned and operated by Standard Slag Co., Marblehead Stone Division. The W pier extends 800 feet into the lake and has depths of 26 to 15 feet along the outer 500 feet of the W side with a deck height of 8 feet. A mobile shuttle loads limestone into vessels at a rate of 2,000 tons per hour. The E side of the W pier and the W side of the E pier are used for loading barges. A prominent overhead conveyor, lighted at night, extends from the piers inland to the quarry.

Marblehead Coast Guard Station is close W of Marblehead Stone Docks. A small sheltered basin at the station has depths of 8 feet decreasing to 6 feet at the edges.

Automobile and passenger ferry services to Kelleys Island are available from a dock just W of the Coast Guard station.

Catawba Island (41°35.0'N., 82°50.5'W.), W of Point Marblehead, juts N from the peninsula on the N side of Sandusky Bay and terminates in **Scott Point. Mouse Island,** useful as a radar target, is a small island on the shoal bank about 0.2 mile N of Scott Point. In the bight between Point Marblehead and Mouse Island, the depths are 18 feet about 1.3 miles off and shoal toward shore. The bottom is rock and boulder strewn. **Middle Harbor Shoal,** with a least depth of 2 feet, is marked on the N side by a lighted buoy about 2.4 miles SE of Mouse Island. A shoal bank with depths of 9 feet is 1.8 miles SE of Mouse Island. Within the bight are the facilities at Lakeside, East Harbor, and West Harbor.

At **Lakeside, Ohio,** about 2.2 miles WNW of Point Marblehead, a dock extends offshore about 600 feet into depths of 10 feet. Several smaller docks to the W extend into lesser depths. Berths with electricity, gasoline, water, marine supplies, sewage pump-out, and hull and engine repairs are available for small craft.

Marblehead-Lakeside is a **customs station.**

East Harbor, 3.9 miles W of Point Marblehead, is a shallow bay with an entrance channel between two parallel piers marked on the outer ends by private lights. The N shore of the harbor is a State park and recreation area, and the waters in the harbor are a public fishing area and game refuge. Numerous small-craft facilities are on the S side of the bay and E of the entrance channel. In 1970, the controlling depth was 5 feet in the entrance channel and thence S and W to the facilities on the S side of the bay. The basin on the E side of the entrance had a controlling depth of 3 feet. Private buoys mark the channel through the harbor.

West Harbor is entered 2.5 miles NW of East Harbor through two entrance channels. The SE entrance is protected by converging jetties marked at their outer ends by lights. A dredged channel, marked by lights, buoys, and daybeacons, leads through the jetties to the head of the harbor. In June-August 1984, the controlling depth was 6 feet, except 4½ feet in the upper 0.3 mile. The NW entrance channel, with a controlling depth of 5 feet in 1966, leads to a large small-craft harbor. The entrance is protected by jetties marked by lights at their outer ends. In 1976, an obstruction covered 2 feet was reported 50 feet NE of the S jetty light. A fixed highway bridge at the head of the harbor has a reported clearance of 20 feet. Beyond the bridge, a dredged channel leads SW through West Bay to join the channel from the SE entrance. In June-August 1984, the controlling depth was 4 feet. Boats drawing up to 3 feet can be accommodated at docks in the harbor. Gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, launching ramps, and a 20-ton hoist are available.

Just W of Scott Point is the mainland terminus of the automobile and passenger ferry line operating to the islands N of Catawba Island. A depth of about 11 feet is at the outer face of the dock. About 400 feet W of the ferry dock is a dock of the Port Clinton Fish Co., with depths of about 4 feet alongside. Catawba State Park is on the W side of Catawba Island. A light marks the outer end of the park pier.

Just SE of the State park pier, a pier marked at the outer end by a private light protects the SW side of the entrance to a small-craft basin. The entrance channel has depths of about 5 feet with 5 feet at the berths on the W side of the harbor and 3 feet at the berths on the E side. Gasoline, diesel fuel, water, ice, electricity, marine supplies, and hoists to 40 tons for hull, engine, and minor electronic repairs are available.

Charts 14830, 14844, 14842, 14846.–Between Catawba Island and **Locust Point** (41°36.2′N., 83°05.0′W.), a rounding projection 12 miles W, a broad open bight has depths less than 24 feet. The Portage River empties into the S side of the bight. A large shallow bank with depths less than 14 feet extends about 5.5 miles N and NE off Locust Point. A least depth of 2 feet, marked on the E side by a buoy, is about 4.7 miles NE of the point, and there are scattered patches of 3 to 10 feet elsewhere. **Niagara Reef,** a detached shoal with a least depth of 3 feet, is 6.8 miles NE of the point and is marked on the N side by a lighted buoy Strangers should not attempt passage S of Niagara Reef.

Port Clinton, Ohio, is at the mouth of the **Portage River,** about 29 miles SE of Toledo Harbor entrance. The river enters the lake at the S end of the bight immediately W of Catawba Island. This bight is quite shoal, the depths ranging from 6 feet off the end of the piers to 18 feet about 3.3 miles from shore.

Prominent features.–A yellow stack and a lighted relay tower in the city near the inner end of the entrance channel are prominent. The two form a rough range for approaching the harbor.

Port Clinton Light 2 (41°31.1′N., 82°56.2′W.), 26 feet above the water, is shown from a white skeleton tower with a small white house and a triangular red daymark on the outer end of the W pier.

Channels.–The harbor is entered through a dredged entrance channel leading from deep water in Lake Erie between two parallel piers upstream in Portage River for about 0.4 mile to the Monroe Street highway bridge. Lights mark the outer ends of the piers. In 1980, the controlling depth was 8½ feet through the entrance channel up to the bridge except for shoaling to 4½ feet along the NW edge of the channel about 1,600 feet 212° from Port Clinton Light 2. The channel lakeward of the piers is subject to shoaling.

Bridges.–The Monroe Street highway bridge, 0.4 mile above the river mouth, has a bascule span with a clearance of 9 feet. An overhead cable 0.1 mile above the bridge has a clearance of 83 feet. The ConRail bridge 1.5 miles above the mouth has a roller-lift span with a clearance of 13 feet. (See 33 CFR 117.1 through 117.59 and 117.851, chapter 2, for drawbridge regulations.) The State Route 2 bridge, 3 miles above the mouth, has a fixed span with a clearance of 30 feet.

Harbor regulations.–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor by the city of Port Clinton.

Wharves.–The S side of the Portage River has three commercial facilities. Parker Boat Line operates a ferry between Port Clinton and Put-In-Bay, Port Clinton Fisheries receives fish at a wharf W of the ferry dock, and the Port Clinton Lumber Co. receives sand at a wharf on the W side of the Monroe Street bridge.

Small-craft facilities.–Above the Monroe Street bridge, several marinas provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and marine supplies. Hoists to 45 tons and a 150-ton marine railway are available for hull, engine, and electronic repairs. A marina on the lakefront about 2 miles WNW of Port Clinton provides gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and marine supplies. A 20-ton hoist is available for hull and engine repairs.

Charts 14830, 14846.–About 4 miles W of Port Clinton, a **danger zone** for small arms and artillery firing extends 6.5 miles NE, 10 miles N, and 12 miles NW from **Camp Perry. (See 33 CFR 334.850,** chapter 2, for limits and regulations.) A jetty extends from the shore at Camp Perry to a pier about 1,000 feet offshore.

Toussaint River is entered about 8 miles NW of Port Clinton on the E side of Locust Point. The entrance channel and river are marked by private lighted and unlighted buoys. A shoal is immediately N of the entrance channel. In July 1981, the reported controlling depth was 4½ feet from deep water in the lake through the entrance, and thence upstream to the marina about 1.6 miles above the mouth. An overhead power cable with a reported clearance of 65 feet crosses the river about 1.4 miles above the mouth. Transient berths, gasoline, water, ice, sewage pump-out facilities, and launching ramps are available.

The cooling tower of the Davis-Besse Nuclear Power Station is prominent NW of the mouth of the Toussaint River.

Between Locust Point and **Cedar Point,** 15 miles NW, the 18-foot contour decreases from about 7 miles offshore at Locust Point to 2.5 miles at Reno Beach and then increases to 4.5 miles at Cedar Point. Several isolated 17-foot spots are beyond the 18-foot contour NE of Cedar Point.

Long Beach, a private harbor for small boats, is on the N side of Locust Point. A private **159°** lighted range marks the entrance to the basin.

Turtle Creek, about 2.5 miles W of Locust Point, has two marinas at its mouth. In 1977, the reported controlling depth in the mouth of the creek was 1 to 2 feet. The entrance is marked by a private **129°** lighted range and buoys. Numerous submerged piles are in the mouth of the creek. Caution is advised. Transient berths, gasoline, water, ice, launching ramps, and a 60-ton hoist are available.

Ward Canal is entered about 6 miles WNW of Turtle Creek. Two jetties protect the entrance channel. A light marks the outer end of the E jetty. In May 1981, a sandbar was reported across the mouth of the canal. Caution is advised. Small-craft facilities are available in the canal.

Cooley Creek is entered 2.9 miles NW of Ward Canal. The breakwaters that protect the entrance channel are marked at the outer and inner ends by private lights. Facilities in the creek provide transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, and launching ramps. Hoists to 75 tons are available for hull and engine repairs.

Charts 14830, 14846, 14847.–Maumee Bay is a large shallow expanse forming the SW corner of Lake Erie. The bay has prevailing depths of less than 10 feet and is obstructed by several dumping grounds. A dredged channel leads from deep water in Lake Erie SW through the bay to the mouth of the Maumee River.

Toledo Harbor, serving the city of **Toledo, Ohio,** is at the W extremity of Lake Erie. The harbor includes the lower 7 miles of the **Maumee River** and a channel about 18 miles long through Maumee Bay from deep water in Lake Erie to the mouth of the river. The principal cargoes handled at the port are coal, iron ore, grain, petroleum products, and general cargo.

Prominent features.–The TV towers S to SW of Cedar Point and the stacks of the Consumers Power Company 6.6 miles WNW of Toledo Harbor Light are conspicuous in the approach to the harbor.

Toledo Harbor Light (41°45.7'N., 83°19.7'W.), 72 feet above the water, is shown from a square brick buff-colored dwelling with an attached fog-signal house on the NW side of the entrance channel about 8.5 miles NE of the river mouth. A fog signal and radiobeacon are at the light. Maumee Bay Entrance Lighted Bell Buoy 2, about 8 miles NE of the light, is equipped with a radar transponder beacon (Racon). (See Racons, chapter 1, for additional information.)

Channels.–A dredged entrance channel, marked by buoys, lights, and a **237¾°** lighted range, leads SW for about 18 miles from deep water in Lake Erie through the shallow water of Maumee Bay to the mouth of Maumee River, thence upstream for about 7 miles. Maumee Mooring Basin is on the NW side of the channel at the mouth of the river, and turning basins are 2.7, 6.3, and 7 miles above the mouth.

The Federal project depths are 28 feet from deep water in the lake through the entrance channel to the mouth of the river and in Maumee Mooring Basin; thence 27 feet in the river channel to the upstream limit of the project with 20 feet in Riverside Turning Basin, 2.7 miles above the mouth; thence 27 feet in the turning basin 6.3 miles above the mouth; and thence 18 feet in the turning basin at the head of the project, 7 miles above the mouth. (See Notice to Mariners and latest edition of charts for controlling depths.)

No distinct bars form in the dredged channel, which is, however, subject to considerable fill along its sides each year. Depths in Maumee Bay outside of the improved channel are less than 10 feet, and navigation is possible for small boats only. In the lake, dredge operations have thrown up a ridge of earth along the edges of the channel. This ridge may rise as much as 3 feet above the natural lake bottom. In order to avoid the ridges, deep-draft vessels should pass **Maumee Bay Traffic Lighted Buoy** (41°50.1'N., 83°10.1'W.) close aboard and enter the entrance channel between the outermost lakeward buoys.

A diked disposal area is on the SE side of the entrance channel at the mouth of the Maumee River. The disposal area, about 242 acres, extends about 0.9 mile into the bay from the shore. A turning area and pump-out platform marked by lights, are on the NW side of the disposal area.

Upstream of the dredged channel in the Maumee River, the channels are irregular and of uncertain depths, with numerous shoals and rock bars. Boats with local knowledge drawing less than 5 feet can usually pass as far as **Perrysburg, Ohio,** about 7 miles above Toledo.

Local bridge regulations.–Section 22-4-1.

4. No bridge owners shall obstruct, or permit or cause to be obstructed the passage of any vessels by permitting trucks, automobiles, railroad cars, locomotives or other obstructions to remain upon or across their moveable bridge for longer than fifteen (15) minutes to the hindrance or inconvenience of vessels signaling to pass through any such bridge. No bridge owner shall fail, at the end of each fifteen (15) minute period of obstruction of vessel passage, to cause such trucks, automobiles, railroad cars, locomotives or other obstructions to be removed for sufficient time to allow passage of all such vessels.

This section does not apply to obstruction of vessel passage caused by a continuously moving through train or by circumstances wholly beyond the control of the bridge owner, but applies to other

Structures across Maumee River at Toledo

**Miles above the mouth of the river*

***Clear width in feet proceeding upstream*

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
1	Overhead cable	Power	0.92				154	
2	Overhead cable	Power	1.03				129	132 feet over channel.
3	Overhead cable	Power	1.06				146	
4	Toledo Terminal RR bridge	Railroad	1.07	143	145		22	Swing.
5	Norfolk & Western Ry. bridge	Railroad	1.80	145	136		20	Swing.
6	Overhead cable	Power	1.80				107	
7	Craig Memorial Bridge	Highway	3.30			200	38	Bascule. 44 feet at center.
8	ConRail bridge	Railroad	3.95	115	115		17	Swing.
9	Overhead cable	Power	4.06				140	
10	Cherry St. bridge	Highway	4.30			200	21	Bascule. 31 feet at center.
11	Anthony Wayne Bridge	Highway	5.16			747	104	Fixed. Note 1.
12	ConRail bridge	Railroad	5.76	115	115		17	Swing.
13	Overhead cable	Power	5.76				105	
14	Michael DiSalle Bridge	Highway	6.73	110	110		45	Fixed.
15	Toledo Terminal RR bridge	Railroad	11.38	110	110		53	Swing.
16	Overhead cable	Power	11.40				110	
17	Ohio Turnpike bridges	Highway	11.42	110	110		37	Twin fixed.
18	Perrysburg-Maumee Bridge	Highway	14.72	100	100		29	

See 33 CFR 117.1 through 117.49, chapter 2, for drawbridge regulations.

Note 1.–Bridge has a vertical clearance of 108 feet (32.9 meters) on the centerline, decreasing to 104 feet (31.7 meters) at the channel limits and 97 feet (29.6 meters) at the harbor lines.

obstructions, including without limitation, those caused by pavement or track maintenance, stopped trains or trains engaged in switching, loading, unloading or shift change.

Upon the filing of an affidavit or complaint for violation of this section, summons shall be issued to the bridge owner, which summons shall be served on the owner or the agent of the owner within the city of Toledo.

Section 22–4–2. Vessels Approaching Bridges. It shall be unlawful for any master or person in charge or in possession of any vessel navigating the harbor to approach any nearer to any of the bridges than to a point at a distance from such bridge within which such vessel can be stopped without colliding with such bridge unless he has received the approval signal of one long and one short blast.

Section 22–4–3. Bridges To Be Lighted. All bridges over the Maumee River in the city of Toledo shall be lighted in accordance with the regulations of the United States Coast Guard and lights shall be visible on a dark night with clear atmosphere at least one nautical mile or about 2,000 yards.

Section 22–4–4. Vessels Passing Through Bridges. All vessels navigating the harbor when passing any bridge shall be moved as expeditiously as is consistent with a proper movement in the river and shall not be anchored or fastened to interfere with the opening or closing of any bridge.

Section 22–4–5. One Vessel Tow. It shall be unlawful for any person to cause any vessel to tow more than one vessel at a time through any movable bridge in the harbor, providing that this shall not be construed as applying to scows or yachts.

Section 22–4–6. Passing on After Signal To Open. When any bridge operator shall be about to open the span of any bridge within the limits of the city he shall give notice to land traffic of his intention to open such movable span by raising a flag, ringing a bell, or other signal or flashing a red light. After such notice is given, no person shall walk, ride or drive any vehicle upon such movable span while such bridge operator is opening or closing the same.

Section 22–4–9. Duty of Bridge Operators. It shall be the duty of the bridge operator in all cases to report to his immediate superior any infraction of this article.

Section 22–4–10. Penalty. Any master, owner or person in possession, charge or control of any vessel, any owner or operator responsible for operation of a moveable bridge or any other person, firm or corporation who shall violate any of the provisions of this article shall be deemed guilty of a misdemeanor of the fourth degree as set forth and provided for in Section 17–1–111 in the case of an individual and Section 17–1–113 as to organizations.

Fluctuations of water level.–In addition to the fluctuations that affect Lake Erie somewhat uniformly, sudden abnormal changes due to wind frequently occur at this port. The observed wind-produced fluctuations, in combination with prevailing high or low water, range between extremes of 8 feet above and 7 feet below Low Water Datum. NE winds can increase water levels as quickly as 2 feet in 1 hour. Ice jams near the mouth of Maumee River have raised the water in the river as high as 12 feet above Low Water Datum.

Mariners are cautioned that when water levels are above Low Water Datum, bridge clearances are correspondingly reduced. The Toledo-Lucas County Port Authority, telephone, 419-243-8251, will measure the height of masts upon request.

A National Ocean Service water level gage house is near the W shoreline of the river adjacent to the Toledo Coast Guard Station. A submerged intake pipe extends about 300 feet riverward from the gage house. Mariners should avoid all movement of deep-draft vessels or the dragging of anchors in the vicinity of the water intake pipe.

Upon request, the Toledo Coast Guard Station will broadcast water level information in the following format:

"This is the U.S. Coast Guard Toledo Station. The National Ocean Service water level gage at this station now reads plus/minus inches above/below Low Water Datum. This is the U.S. Coast Guard Toledo Station. Out."

Currents.–The current in the Maumee River is about 1 mph.

Weather.–(See page T-6 for **Toledo climatological table.**)

Towage.–Tugs to 2,200 and 1,400 hp are available from Gaelic Tugboat Co. or Great Lakes Towing Co., respectively. Arrangements for tugs are made through the companies' dispatchers at 419-243-8972 or 800-621-4330, respectively. Great Lakes Towing Co. has VHF-FM capability for tug arrangements.

At least 2 hours advance notice is requested. Vessels proceeding upstream to the grain elevators near the head of the Federal project usually require the assistance of tugs, but vessels proceeding to the general cargo wharves below the bridges generally do not require assistance.

Toledo is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard.–A Coast Guard **Marine Safety Office** is at Toledo. (See appendix for address.) Toledo Coast Guard Station is on the NW side of the mouth of the Maumee River.

Harbor regulations.–Speed in harbor. In Maumee Bay, lakeward of Maumee River Lighted Buoy 49, no vessel greater than 100 feet long shall exceed 12 mph (10.4 knots). No person shall operate any vessel over 40 feet long in the harbor at a speed greater than 6 mph (5.2 knots). Vessels greater than 100 feet long shall not overtake another vessel in the harbor. (See **33 CFR 162.150,** chapter 2, for speed limits and regulations.)

Copies of the harbor regulations may be obtained from City of Toledo, Division of Streets, Bridges and Harbor, 1189 West Central Avenue, Toledo, Ohio 43610.

Harbor Patrol.–The Toledo Harbor Patrol maintains an office adjacent to the Coast Guard station.

Wharves.–Toledo has numerous facilities along both sides of the Maumee River. Only the deep-draft facilities are described. (For complete information on the port facilities, refer to Port Series No. 44, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The depths alongside for the facilities described are reported depths. (For the latest depths, contact the operator.) All the facilities described have highway connections, and most have railway connections. Water and electrical shore-power connections are available at many of the piers, wharves, and docks. General cargo at the port is generally handled by ships' tackle. Specialized equipment is described under the individual facility. Many of the harbor facilities are used for mooring of vessels during the closed navigation season.

Facilities on the E side of the river:

Lakefront Pellet Terminal Dock: (41°42'00"N., 83°26'54"W.); 2,105-foot face; 27 feet alongside; deck height, 10 feet; open storage for 923,000 tons of material; receipt of iron ore pellets; owned by Chesapeake and Ohio Railway, Baltimore and Ohio Railroad, and ConRail; operated by Toledo Ore Railroad Co.

Toledo Docks, Pier No. 3: (41°42'00"N., 83°27'06"W.); 1,202-foot E face; 1,054-foot W face; 27 feet alongside; deck height, 10 feet; four hulett-type ore unloaders; receipt of iron ore; owned by Chesapeake and Ohio Railway, Baltimore and Ohio Railroad, and ConRail; operated by Chessie System-Toledo Docks.

Toledo Docks, Ore and Coal Dock: (41°41'40"N., 83°27'34"W.); 1,760 feet of berthing space; 27 feet alongside; deck height, 12 feet; one traveling coal loading tower, rate 6,000 tons per hour; receipt of iron ore, shipment of coal and petroleum coke; bunkering vessels; owned by Toledo-Lucas County Port Authority and operated by Chessie System-Toledo Docks.

Toledo Docks, Middle Pier: across slip W of Toledo Docks, Ore and Coal Dock; 1,398-foot E face; 1,993 feet of berthing space along W side; 27 feet alongside; deck height, 12 feet; one car dumper on each side of pier; shipment of coal and occasional shipment of coke, limestone, and ore; bunkering vessels; owned by Toledo-Lucas County Port Authority and operated by Chessie System-Toledo Docks.

Toledo Docks, West Pier: across slip W of Toledo Docks, Middle Pier; 1,123-foot E face; 27 feet alongside; deck height, 12 feet; one car dumper; shipment of coal and petroleum coke; bunkering vessels; owned by Toledo-Lucas County Port Authority and operated by Chessie System-Toledo Docks.

Toledo-Lucas County Port Authority Facility No. 1 Wharf: (41°41'14"N., 83°28'21"W.); 4,196-foot face;

27 feet alongside; deck height, 11 feet; 122,000 square feet covered storage; 90 acres open storage; tank storage for 8 million gallons; six traveling gantry cranes to 110 tons; receipt and shipment of general and containerized cargo and miscellaneous bulk materials; receipt of molasses and liquid fertilizer; owned by Toledo-Lucas County Port Authority and operated by Toledo-Lucas County Port Authority and Toledo World Terminal, Inc.

Ashland Petroleum Co., Toledo Terminal Dock: 500 feet above Toledo Terminal Railroad bridge; 252 feet of berthing space with dolphins; 20 feet alongside; deck height, 6 feet; pipelines extend to tank storage, capacity 320,000 barrels; receipt and shipment of petroleum products, toluene, xylene, and solvents; owned by Texby, Inc. and operated by Ashland Petroleum Co.

Standard Oil, Marine Dock: 800 feet above Toledo Terminal Railroad bridge; 257-foot face; 21 feet alongside; deck height, 7½ feet; pipelines extend to tank storage, capacity over 1 million barrels; shipment and occasional receipt of petroleum products; owned by Norfolk and Western Railway Co. and operated by Standard Oil Co. of Ohio and Merce Boiler and Welding Co.

Sun Petroleum Products Co. Maumee River Wharf: 100 feet below Craig Memorial Bridge; 918 feet of berthing space; 18 to 27 feet alongside; deck height, 12 feet; tank storage for about 2½ million barrels; shipment of fuel oil and benzene; owned and operated by Sun Petroleum Products Co.

City of Toledo, Division of Streets, Bridges, and Harbor Wharf: 0.3 mile above Cherry Street bridge; 1,044 feet of berthing space; 25 feet alongside; deck height, 10 feet; 40-ton derrick; 25-ton crane; 45,000 square feet of open storage; receipt of salt; owned and operated by city of Toledo.

Mid-States Terminals Wharf: 1 mile above Anthony Wayne Bridge; 1,790 feet of berthing space; 27 feet alongside; deck height, 10 feet; 10 vessel-loading spouts, total loading rate 55,000 bushels per hour; three independent vessel-loading spouts, combined rate 80,000 bushels per hour; 10 million-bushel grain elevator; shipment of grain; owned and operated by Mid-States Terminals, Inc.

Facilities on the W side of the river:

Apex Oil Co. Wharf: immediately above Norfolk and Western Railway bridge; 403-foot SW face; 20 feet alongside; deck height, 10 feet; tank storage for 216,000 barrels; receipt and shipment of petroleum products; owned and operated by Apex Oil Co.

Consolidated Dock: immediately below Craig Memorial Bridge; 1,640-foot face, permanently moored breasting vessel in center 440-foot section; 28 feet alongside breasting vessel, 16 to 21 feet along other sections; deck height, 12 feet; cranes to 100 tons; covered storage for 75,000 tons of material; open storage for 500,000 tons of material; receipt of miscellaneous bulk materials; owned by Wills Trucking, Inc., and operated by Consolidated Dock, Inc.

Toledo Harbor Warehousing Corp. Wharf: immediately above Craig Memorial Bridge; 750 feet of berthing space; 20 feet alongside; deck height, 10 feet; 25,000 square feet covered storage; receipt of newsprint; owned by ConRail and operated by Toledo Harbor Warehousing Corp.

Nicholson Industries Co., Plant No. 1 Wharf: 0.4 mile above Craig Memorial Bridge; 1,280-foot face; 12 feet alongside; deck height, 10 feet; open storage for 217,000 tons of material; receipt of sand, stone, and salt; owned by ConRail and operated by Nicholson Industries Co.

Huron Cement Toledo Terminal Wharf: immediately below Cherry Street bridge; 782 feet of berthing space; 18 to 22 feet alongside; deck height, 8 feet; receipt of bulk cement; owned and operated by Huron Cement, Division of National Gypsum Co.

The Andersons Grain Wharf: 0.7 mile above Anthony Wayne Bridge; 1,030-foot face; 27 feet alongside; deck height, 9 and 15 feet; six vessel-loading spouts, total loading rate 50,000 bushels per hour; 7-million-bushel grain elevator; shipment of grain, receipt of fertilizer materials; owned and operated by The Andersons.

Kuhlman Corp., Yard No. 1 Dock: 0.9 mile above Anthony Wayne Bridge; 265-foot face; 18 feet alongside; deck height, 6 feet; open storage for 100,000 tons of material; receipt of sand and gravel; owned and operated by Kuhlman Corp.

Cargill, Toledo Elevator Dock: immediately below Michael DiSalle Bridge; 590 feet of berthing space with dolphins; 30,000-bushel-per-hour vessel-loading spout; 6.1-million-bushel grain elevator; shipment of grain; owned and operated by Cargill, Inc.

Supplies.–All types of marine supplies and provisions are available at Toledo. Water can be obtained at most berths. Bunker fuel is available by barge at most berths, by pipeline at refinery landings, and by truck at some wharves.

Foreign-Trade Zone No. 8 is in Toledo. (See chapter 1, Foreign-Trade Zones, and appendix for address.)

Repairs.–All types of above- and below-the-waterline repairs to hulls, boilers, engine and deck machinery, and electronic equipment can be made in the harbor. The American Ship Building Co. has two drydocks on the E side of the river about 2.5 miles above the mouth. The largest has a length of 650 feet with widths of 100 feet at the top and 83 feet at the keel blocks. The depth over the sill is 14 feet. Hans Hansen Welding Co., on the W side of the river 2 miles above the mouth, has a 50-ton hoist that can handle 75-foot vessels. Merce Boiler and Welding Co. performs repairs to vessels at their berths.

Small-craft facilities.–Several marinas at Toledo provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. A 40-ton hoist is available for hull and engine repairs.

Communications.–Toledo is served by nine railroad lines and has good highway connections. Several airports are near the city.

Ottawa River empties into Lake Erie about 3.5 miles N of the mouth of the Maumee River. The river is used by small boats drawing 2 to 4 feet. In

May 1980, a submerged obstruction was reported in the approach to the river in about 41°44.5'N., 83°27.3'W. The fixed highway bridge about 2 miles above the mouth has a clearance of 14 feet. Several marinas on the river provide gasoline, water, electricity, sewage pump-out, launching ramps, marine supplies, and hoists to 20 tons for hull and engine repairs. A **slow-no wake speed** is enforced on the river.

Shantee Creek and **Halfway Creek** empty into Lake Erie just N of the mouth of Ottawa River. A **slow-no wake speed** is enforced on both creeks.

Charts 14830, 14846.–From **North Cape**, on the N side of Maumee Bay, N to the mouth of the River Raisin, the shore is low and wooded. The 18-foot contour varies from 9 miles offshore at Toledo to 3 miles offshore at Monroe. The **State boundary** between Ohio and Michigan is about 2.5 miles N of the mouth of the Maumee River.

Toledo Beach is a small-craft harbor about 6.3 miles NW of Toledo Harbor Light. The entrance channel is marked by a private **290°** lighted range, and the ends of the breakwaters are marked by private lights. In 1977, depths of 6 feet were reported in the entrance channel. Facilities in the harbor provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, some marine supplies, and a launching ramp. A 35-ton hoist can handle 60-foot vessels for hull and engine repairs.

Otter Creek, 1.3 miles N of Toledo Beach, has a small-craft harbor inside the mouth. The entrance channel to the creek is 25 to 30 feet wide between two short piers. Two private lights on the S pier form a **284°** range for approaching the creek. Depths in the approach and creek are 2 to 3 feet. In March 1985, shoaling to an unknown extent was reported about 200 feet, 095° from the front range light. Gasoline, water, ice, sewage pump-out facilities, some marine supplies, and a launching ramp are available. A hoist can handle 38-foot vessels for hull and engine repairs.

Bolles Harbor, Mich., is a small-craft harbor at the mouth of **La Plaisance Creek,** about 2.7 miles SW of the mouth of the River Raisin.

Channels.–A dredged entrance channel leads NW from Lake Erie through **La Plaisance Bay** to the mouth of La Plaisance Creek, thence upstream for about 0.8 mile. A jetty is on the W side of the mouth and a diked disposal area extends about 1,700 feet lakeward from the E side of the mouth. The entrance channel is marked by a **341.5°** lighted range, buoys, a daybeacon, and a light, and the outer end of the jetty and dike are marked by lights. In April-May 1982, the controlling depths were 2½ feet (4 feet on the centerline) in the approach from the lake to the entrance, thence in 1978-1981, the controlling depth was 4 feet to the head of the project.

In 1977, a diked disposal area enclosing the berm was under construction on the E side of the entrance channel.

A **slow-no wake speed** is enforced in La Plaisance Creek. Marinas in the creek provide transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, marine supplies, and launching ramps. A 20-ton hoist can handle 50-foot vessels for hull and engine repairs.

Monroe Harbor is within the mouth of the **River Raisin,** which flows into the W end of Lake Erie about 15 miles NNE of the mouth of the Maumee River. Two 816-foot lighted stacks are prominent near the mouth of the River Raisin.

Channels.–A dredged entrance channel leads from the deep water in Lake Erie to the mouth of the River Raisin, thence to a turning basin with its upper end 1.5 miles above the mouth. The entrance channel is marked by buoys and a **291°45'** lighted range. In 1983, the controlling depth was 16 feet (19 feet at midchannel) in the entrance channel to Monroe Harbor Buoy 7, thence in 1984-1985, 8 feet (16 feet at midchannel) to the turning basin, with 6 to 18 feet in the basin except for shoaling to 3½ feet along the W edge. The channels in this harbor are subject to extensive shoaling from waterborne silt and littoral drift from Lake Erie.

Bridges.–Two overhead power cables with a minimum clearance of 160 feet cross the River Raisin 0.75 mile above the mouth. Another cable, with a clearance of 60 feet, crosses the river about 1.7 miles above the mouth. The Detroit-Toledo Freeway bridge 2.1 miles above the mouth has a fixed span with a clearance of 23 feet.

Harbor regulations.–A **speed limit** of 10 mph (8.7 knots) is enforced in the entrance channel and 6 mph (5.2 knots) in the river channel. (See **33 CFR 162.145,** chapter 2, for regulations.)

Towage.–Tugs for Monroe Harbor are available from Detroit. (See Towage under Detroit.)

Wharves.–Monroe Harbor has three deep-draft facilities. (For a complete description of the port facilities, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. For information on the latest depths, contact the operators.

Detroit Edison Co., Monroe Plant Wharf: S side of the mouth of the river; 1,550-foot face; 21 feet alongside; deck height, 12 to 15 feet; open storage for 2 million tons of coal; receipt of coal; owned and operated by Detroit Edison Co.

Ford Motor Co. Monroe Plant Wharf: N side of the river 1 mile above the mouth; 600 feet of berthing space along natural bank; 21 feet alongside; open storage for 20,000 tons of coal; receipt of coal; owned and operated by Ford Motor Co.

Port of Monroe

General and Bulk Cargo and Dundee Cement Coke Docks: SE side of the turning basin, 1,400 feet of berthing space 18 feet alongside, deck height, 6 feet; two berths along S side of river below turning basin, 600- and 650-foot faces, 20 feet alongside; 32,000 square feet covered storage; 28 acres open storage; receipt of dry bulk cargoes, petroleum coke, and coal; owned and operated by the Monroe Port Commission and Dundee Cement Co.

From the mouth of the **River Raisin,** the shoreline trends N about 4 miles and then E about 2 miles to **Stony Point,** a narrow peninsula extending about 0.5 mile S into the lake. **Brest Bay** is the bight formed on the W side of the point. A wreck covered 17 feet is 1.9 miles SSE of Stony Point. In August 1982, a dangerous sunken wreck was reported about 1.5 miles SW of Stony Point in about 41°55.0′N., 83°17.0′W.

At **Sandy Creek,** about 2 miles N of Monroe Harbor, on the W side of Brest Bay, is a small-boat harbor. Sterling State Park is on the S side at the entrance to the creek. Private buoys and a private **303°30′** lighted range mark the entrance channel. In 1977, depths of 3 to 4 feet were reported in the entrance with 4 feet alongside the piers. Shoaling was reported on the S side of the entrance. In May 1981, severe shoaling was reported on the range line. Transient berths, gasoline, water, ice, and electricity are available.

Stony Creek empties into the N side of Brest Bay. Spoil banks that extend SE from the mouth of the creek protect the entrance channel to the creek. Piles mark the channel between the spoil banks. Submerged rocks are close S of the channel. In 1977, it was reported that a submerged pipeline, covered 1 foot, crosses the entrance to the creek, limiting the harbor to small craft. A marina inside the creek mouth provides gasoline, ice, some marine supplies, and a launching ramp. A 3-ton lift is available for hull and engine repairs.

On the E side of Stony Point, the 18-foot curve is about 0.6 mile offshore, increasing to 3.8 miles off at Swan Creek. From Swan Creek to **Pointe Mouillee,** on the W side of the mouth of the Detroit River, depths are generally less than 18 feet except for the dredged channels leading to the Detroit River.

The water intake channel of the Enrico Fermi Power Plant is 2 miles N of Stony Point. Private lights mark the dikes on either side of the channel. Two 403-foot cooling towers at the plant are prominent.

Swan Creek is about 3.2 miles N of Stony Point. A private **312°** lighted range on the N side of the creek entrance marks the approach to the creek. Inside the entrance, steel pipes mark the N limit of the channel. In 1977, a controlling depth of 2 feet was reported in the entrance channel. In December 1985, an obstruction was reported on the approach to the entrance channel about on the range line, 230 feet from the front range light. A **slow-no wake speed** is enforced in the creek. Transient berths, gasoline, water, ice, electricity, sewage pump-out facilities, limited marine supplies, a 10-ton lift, and hull and engine repairs are available.

Charts 14830, 14848, 14849.–Detroit River Light (42°00.1′N., 83°08.5′W.), 55 feet above the water, is shown from a white conical tower, upper part black, on a hexagonal pier in the entrance to the Detroit River E of Pointe Mouillee. A fog signal and radiobeacon are at the light. A radar beacon (Racon) is also at the light. (See **Racons,** chapter 1, for additional information.)

In 1977, an irregularly shaped diked disposal area was under construction about 2.5 miles W of Detroit River Light. A dredged channel, marked by buoys, leads W from the light to the disposal area. In December 1981, the controlling depth was 11 feet (16 feet at midchannel) from the entrance to the disposal area.

Charts 14820, 14830.–For about 25 miles W from a line between Point Marblehead on the S shore and Point Pelee on the N shore, Lake Erie is rendered foul by a group of islands and shoals. The main route for large vessels is through Pelee Passage in the N part of the area, but other passages of limited capacity are also available to the S. Submerged fish net stakes may be encountered throughout the W end of Lake Erie.

The **International boundary** between the United States and Canada extends through this area in a series of straight lines bearing from the E into the NW. It is well marked by buoys, painted with orange and white horizontally banded stripes and alphabetically lettered through "H", proceeding from E into the NW.

Charts 14830, 14844, 14842.–South Passage extends along the S shore of Lake Erie, bounded by Point Marblehead and Catawba Island on the S and Kelleys Island, South Bass Island, and Green Island on the N. Although it is obstructed by numerous shoals, a depth of 16 feet can be carried through the passage.

Kelleys Island is about 4 miles N of Point Marblehead with a deep channel 2.7 miles wide between. The island, about 3 miles long E and W and about 2 miles wide N and S, is bordered on the E side by a rocky bank that extends 0.7 mile off. A buoy marks the extent of the bank E of **Long Point,** the NE point of the island. The other shores of the island should not be approached closer than 0.25 mile except at the landings. W of Long Point, an open bay has depths of 18 feet to within 0.4 mile of the shore. A dangerous sunken wreck is 0.4 mile W of Long Point. Kellstone, Inc. has a dock on the W side of the island, and a ferry dock with service to Marblehead and Sandusky is on the SW side of the island. A small-craft basin is on the E side of the broad bight on the S side of the island. Jetties protect the entrance channel to the basin. In May 1980, shoaling to 4 feet was reported to extend 75 feet W from the outer end of the S jetty. The basin has a depth of about 8 feet. Gasoline, water, and ice are available.

W of **Carpenter Point,** the W point of Kelleys Island, several submerged rocks are covered less than 18 feet. A rock, covered 12 feet, is marked on the S side by a lighted buoy 0.6 mile WNW of Carpenter Point. A wreck, covered 17 feet, is 0.6 mile N of the point.

American Eagle Shoal, extending W from Carpenter Point, has a least depth of 10 feet about 1.7 miles

W of the point. **South Shoal,** with depths of 15 to 18 feet, continues W from American Eagle Shoal. These shoals lie on the NE side of the vessel route through South Passage. Numerous submerged net stakes, covered 13 to 18 feet, are in or near the vessel route SE of South Shoal.

Scott Point Shoal, W of South Shoal on the SW side of the vessel route, is rocky and has a least depth of 11 feet at the NE end where it is marked by a lighted buoy. From the buoy, the shoal extends SW to within 0.6 mile of **Mouse Island. Mouse Island Reef,** with a least depth of 9 feet, is on the SW side of the vessel route, 1 mile WNW of Scott Point Shoal. **Starve Island Reef,** with a least depth of 7 feet, is on the NE side of the vessel route and is marked off its W side by a lighted buoy. **Starve Island,** 1 mile N of Starve Island Reef, is on a shoal bank off the SE side of South Bass Island. The shoal bank extends from South Bass Island to an 8-foot spot 0.5 mile SE of Starve Island. A deepwater passage about 0.4 mile wide is between the 8-foot spot and Starve Island Reef.

South Bass Island, about 3.5 miles long NE and SW, is 2.5 miles N of Mouse Island and 5 miles NW of Kelleys Island. Shoals extend 0.2 to 0.5 mile off the SE side of the island except at Starve Island, and the W side of the island is deep-to. **South Bass Island Light** (41°37.7'N., 82°50.5'W.), 74 feet above the water, is shown from a white skeleton tower with a red and white diamond-shaped daymark on the SW point of the island.

Put-In-Bay, a semicircular inlet on the N side of South Bass Island, is protected on the W side by **Peach Orchard Point.** A shoal with a least depth of 2 feet extends 0.25 mile NE from the point and is marked at the outer end by a lighted buoy. **Gibraltar Island** is a small bold islet in the W part of the bay on the E side of Peach Orchard Point. Shallow water is between the SW side of the island and the shore. A buoy marks a detached shoal with a least depth of 10 feet on the E side of the bay.

Perry's Victory and International Peace Memorial, commemorating his victory in the naval battle of 1813, is a conspicuous landmark on the E side of Put-In-Bay on the narrow constriction of South Bass Island. The 356-foot monument is a granite tower marked by a light and surmounted by a glass-covered bronze bowl.

Put-In-Bay, Ohio, a harbor on the S side of the bay, is used principally for fruit shipments and excursion business.

Channels.–From natural depths of 14 feet in the bay, a dredged channel, marked by buoys, leads W along the piers on the S side of the bay. In 1975, the controlling depths were 14 feet in the E part of the channel and 8 feet in the W part.

Special anchorages are in the bay S of Gibraltar Island. (See **33 CFR 110.1 and 110.84a,** chapter 2, for limits and regulations.)

Small-craft facilities at Put-In-Bay provide gasoline, diesel fuel, water, electricity, sewage pump-out, and a 5-ton hoist.

Green Island, rocky and wooded, is 1 mile W of South Bass Island. A light marks the W end of the island. A shoal extends 0.3 mile off the E end.

Kelleys Island Shoal, with a least depth of 2 feet, is NE of Kelleys Island. A narrow channel with depths of 18 feet or more is between the NE end of Kelleys Island and the SW end of the shoal. The NE end of the shoal is about 2.5 miles from the island and is marked by a lighted buoy. A buoy marks the NW side of the shoal.

Gull Island Shoal, 2.4 miles N of Kelleys Island, is marked on the S side by a lighted buoy. The shoal extends 1.5 miles NE from the buoy. The SW part of the shoal has numerous bare rocks.

Middle Island is about 1.6 miles N of Gull Island Shoal. A dangerous sunken wreck is on the SW side of the island. A deep passage about 0.5 mile wide is between the island and Gull Island Shoal.

Ballast Island is about 0.8 mile NE of the NE point of South Bass Island with shoal water between. A channel with a depth of about 8 feet and marked by buoys leads across the bank about 0.3 mile S of Ballast Island. The N side of Ballast Island is deep-to and is marked by a light.

Middle Bass Island is 0.5 mile N of the NE projection of South Bass Island, and the main body of the island extends N 1.5 miles. From the NE end of the island, a narrow peninsula extends 1.4 miles ENE. A shoal with bare rocks extends 0.75 mile from the end of the peninsula and is marked by a lighted bell buoy. **Sugar Island** is connected to the NW corner of Middle Bass Island by a rocky ledge covered 1 foot. A 10-foot spot is about 0.5 mile NE of Sugar Island. The E, S, and W sides of Middle Bass Island have deep water within 0.3 mile.

Rattlesnake Island, 1 mile W of Middle Bass Island, has clean shores except for a shoal extending 0.15 mile from the E end and a shoal and small islet extending 0.3 mile from the W end. A wreck, covered 23 feet, is 1.2 miles WNW of the island.

North Bass Island is about 1 mile N of Middle Bass Island. Shoals and rocks extend about 0.4 mile offshore around the island except on the W side where a broad bank with depths of 5 to 12 feet extends 1.2 miles off. A buoy marks the SW extremity of the bank. A lighted buoy marks the extent of shoals off the NE side of the island.

Charts 14830, 14844.–An extensive group of shallow rocky spots, covered 10 to 16 feet, is about 1 to 2.5 miles N of North Bass Island. A buoy and a lighted bell buoy mark the S and W extremities of the area, respectively. A dangerous sunken wreck is just SE of the shoals.

A group of small islands and bare rocks is on a shallow bank centered about 4 miles N of North Bass Island. **Hen Island,** 4.5 miles N of North Bass Island, is the largest and northernmost of the group. Shallow water extends about 0.2 mile offshore around the island. About 1 mile S of Hen Island, a very shallow bank extends 2 miles E and W. The other islands of the group are on this bank. **Little Chicken Island** is a small outcropping 1.1 miles S of Hen Island. On the N part of the bank, 0.4 mile

NNW of Little Chicken Island, is a 2-foot spot. Between this spot and Hen Island is a deep passage about 0.25 mile wide. **Chick Island,** 4 feet high, is about 1.2 miles SW of Hen Island. Bare rocks are off the NW and SE sides of the island. **Big Chicken Island,** 12 feet high, is about 1.6 miles SW of Hen Island; bare rocks are off the NW side of the island. A depth of 11 feet is available across the center of the bank between Big Chicken Island and Little Chicken Island.

Hen Island Shoal, with a least depth of 18 feet, is 1.3 miles N of Hen Island and is unmarked.

East Sister Island is 8.5 miles W of Sheridan Point on Pelee Island and 3.2 miles NW of Hen Island. Shoals extend off about 0.25 mile around the island. **East Sister Shoal,** with a least depth of 4 feet, is 0.8 mile NE of the island.

North Harbour Island, 0.7 mile N of East Sister Island, is on a shallow bank with depths to 8 feet extending 0.4 mile N and SE from the island.

Chart 14830.–North Harbour Island Reef, with a least depth of 2 feet and marked on the N side by a lighted buoy, is 1.6 miles N of North Harbour Island. In rough weather, vessels should not attempt passage between the island and the reef.

Middle Sister Island, the northwesternmost of the Lake Erie island group, is 7.6 miles WNW of East Sister Island. The island, about 0.3 mile long, is marked at the NE end by a light. Shoals extend about 0.4 mile off the S shore.

West Sister Island (41°44.4'N., 83°06.4'W.), the westernmost of the island group, is about 8.5 miles NNW of Locust Point on the S lakeshore. The shores of the island are deep-to except for a 1-foot shoal extending 0.4 mile off the SE side. A light marks the SW end of the island.

Charts 14830, *2183.–Pelee Passage is the main vessel route through the island group in the W end of Lake Erie. The passage is bounded on the SW side by Pelee Island and its contiguous shoals and on the N side by Point Pelee and its contiguous shoals. The controlling depth through the passage is about 29 feet. Lighted midchannel buoys mark the turns through the passage, and lights and buoys mark the bordering shoals.

Charts 14830, 14844.–Pelee Island, the largest island in Lake Erie, is about 8 miles N of Kelleys Island and about 8.5 miles SW of Point Pelee on the Canadian mainland. The island is about 3 miles wide with an extreme N-S length of 8.5 miles.

A rocky bank extends 0.5 to 1.5 miles off the E side of Pelee Island with a 6-foot spot 1.3 miles offshore SE of **Middle Point.** At **Mill Point,** the SE point of the island, a detached bank with a least depth of 10 feet extends 1.7 miles E.

South Bay is a broad indentation in the S shore of the island between Mill Point and Fish Point. A marina in the bay provides gasoline, water, ice, marine supplies, engine repairs, and sewage pumpout. A seasonal **Canadian customs vessel reporting station** is in the bay.

Fish Point, the S extremity of the island, is a narrow point extending about 1 mile S from the main body of the island. A shoal with depths of 1 foot extends 0.5 mile S from the end of the point. From that point, a shallow bank with a least depth of 7 feet near the outer end extends 2 miles S. A shallow bank extends about 3 miles E from the point. **Chickenolee Reef,** at the E extremity of the bank, has a least depth of 1 foot and is marked on the E side by a buoy.

West Dock, a 597-foot Government wharf at about midlength of the W side of Pelee Island, has a depth of about 14 feet alongside the outer end and is marked at the outer end by a light. A **Canadian customs vessel reporting station** is at the wharf. Ferries operate from the wharf to Sandusky, Kingsville, and Leamington.

The shoal bank off the W side of Pelee Island has depths of 14 to 20 feet, with its greatest extent of 3.8 miles just S of West Dock.

North Bay is a broad bight on the N side of Pelee Island between **Sheridan Point,** the NW point of the island, and Lighthouse Point, the NE point of the island. From the head of the bay, depths to 18 feet extend 0.7 mile N.

Charts *2181, 14844.–North Wharf is on the SE side of North Bay at the village of **Scudder, Ont.** The 830-foot wharf is protected by a detached breakwater marked on its NE end by a light. A breakwater extending from shore E of the wharf protects a small-craft basin on the E side of the wharf. A dredged approach channel leads E of the detached breakwater to the E side of the wharf. In 1977, the controlling depth was 15 feet. A ferry operates between the wharf and Leamington. Berths with electricity, gasoline, diesel fuel, and a marine railway are available in the small-craft basin.

Charts 14830, *2183.–Lighthouse Point, at the NE end of Pelee Island, is marked by an abandoned lighthouse. From the point, a shoal bank extends about 3 miles E and 3.5 miles NE. At the NE end of the bank, **Middle Ground Shoal** borders Pelee Passage. The shoal has depths of 8 to 18 feet and is marked on the N side by a lighted buoy. A dangerous sunken wreck is about 2,000 feet SE of Lighthouse Point.

Pelee Passage Light (41°51.2'N., 82°34.9'W.), 74 feet above the water, is shown from a red and white circular tower on the N part of Middle Ground Shoal. A radar transponder beacon (Racon) is at the light. (See Racons, chapter 1, for additional information.) The light marks the W entrance to Pelee Passage.

A wreck, covered 17 feet, is 3.2 miles SE of Pelee Passage Light.

From **Point Pelee** on the N side of Pelee Passage, a sand and gravel shoal extends 2.5 miles S and is marked by a lighted buoy. East Shoal and Southeast Shoal continue to a point 6 miles SSE of Point Pelee.

East Shoal, with a least depth of 10 feet, is 3.5 miles SSE of the point. **Southeast Shoal,** with depths of 12 to 18 feet, is at the end of the shoal bank, 6 miles from Point Pelee. It is marked off the SW side by a lighted bell buoy.

Southeast Shoal Light (41°49.6'N., 82°27.8'W.), 70 feet above the water, is shown from a white square building with two black stripes near the S end of the shoal. A fog signal, radiobeacon, and radar transponder beacon (Racon) are at the light. (See Racons, chapter 1, for additional information.) The light marks the E entrance to Pelee Passage.

Wrecks, covered 22 and 17 feet, are 3 miles SW and 3.6 miles NE of Southeast Shoal Light, respectively.

Grubb Reef, on the N side of Pelee Passage 2.8 miles SW of Point Pelee, is an unmarked shoal with a least depth of 11 feet. A detached 17-foot spot, marked on the S side by a lighted buoy, is about 1 mile S of Grubb Reef. An unmarked shoal with a least depth of 23 feet is just NW of Grubb Reef, and a buoy marks the S side of a 26-foot shoal 3.5 miles W. Two wrecks, covered 21 feet, are about 7.5 and 8.5 miles NW of the reef.

Bar Point (42°02.7'N., 83°06.0'W.) is the rounding point of land forming the E side of the mouth of the Detroit River. From Bar Point, the N shore of Lake Erie trends SE for about 11 miles to **Littles Point.** For 6 miles ESE along the shore from Bar Point, the naturally shallow water at the mouth of the Detroit River extends a considerable distance offshore; thence to Colchester, just W of Littles Point, deep water is about 0.5 mile offshore. There are numerous submerged fish net stakes offshore along this stretch.

A small-craft basin at **Colchester, Ont.,** 12 miles E of Detroit River, is protected by two breakwaters marked at the outer ends by lights. The W breakwater leads E from a wharf, extending 593 feet S from shore. In 1978, the entrance and W half of the basin had reported depths of 12 feet, the E side of the basin is reported dry at chart datum.

Grecian Shoal, with depths of 9 to 17 feet and a boulder bottom, is centered about 0.7 mile S of Colchester. A buoy marks the S side of the shoal.

Colchester Reef, with a least depth of 11 feet, is 3.7 miles SSE of Littles Point and is marked by a light. Two wrecks, covered 23 feet, are 1.1 miles N and 2.1 miles NE of the light. Another sunken wreck is 1.7 miles SW of the light.

Pigeon Bay is a broad open bight between Littles Point and Point Pelee, 22 miles E. Shallow water extends no more than 0.7 mile off along the shores of the bay. The towns of Kingsville and Leamington are on the N shore of the bay.

Cedar Beach, Ont., is a summer resort and small-craft harbor at the mouth of **Cedar Creek,** about 7.6 miles ENE of Littles Point. Cedar Beach has a seasonal **Canadian customs vessel reporting station.** The entrance channel to the harbor is between parallel breakwaters, each marked at the outer end by a light. In 1978, the controlling depth was 13 feet in the entrance channel with 9 feet in the basin inside the mouth of the creek. Mariners are cautioned that the depths are subject to continual change due to shifting sand. An overhead power cable with a clearance of 48 feet crosses the creek just inside the mouth. Transient berths, gasoline, water, ice, electricity, a 60-foot marine railway, and hull and engine repairs are available.

Chart *2181.–Kingsville, Ont., on the N shore of Pigeon Bay about 10 miles ENE of Little Point, is an important shipping point for fish and farm products, and the harbor affords the best shelter between the mouth of the Detroit River and Point Pelee.

The harbor consists of a small basin formed by two converging piers marked at the outer ends by lights. A private fog signal is at the light on the E pier, and a **308°10'** lighted range marks the entrance channel between the piers. In April 1983, the reported controlling depth in the entrance channel was 7 feet, but it is subject to shoaling.

Small-craft piers on the N side of the harbor have depths of about 8 feet alongside. Gasoline, diesel fuel, and minor engine repairs are available. A ferry operates between Kingsville and Pelee Island.

Leamington, Ont., is on the N shore of Pigeon Bay about 7 miles E of Kingsville and at the W base of Point Pelee. Ferries operate from Leamington to Kingsville, Pelee Island, and Sandusky. Leamington is a **Canadian customs port of entry.**

The harbor at Leamington is an open roadstead protected on the S by a detached breakwater. The breakwater is marked by a light on each end. The 1,863-foot Government wharf N of the breakwater has depths of about 16 to 20 feet and 11 to 15 feet along the outer ends of the E and W sides, respectively. There are two warehouses at about mid-length of the wharf, the southernmost marked by a light. A light marks the W end of the breakwater to the E of the wharf. The harbor is not maintained by dredging.

Diesel fuel, water, provisions, and minor engine repairs are available at Leamington.

Charts 14830, *2183.–Sturgeon Creek flows into Pigeon Bay about 2 miles SE of Leamington. The mouth of the creek is protected by two breakwaters marked on the outer ends by lights. In 1968, the controlling depth was 6 feet in the entrance channel, thence in 1978, 1 foot was reported in the small-craft basin inside the mouth of the creek. Just inside the mouth are the abutments of a former bridge, an overhead power cable with a clearance of 50 feet, and a fixed highway bridge with a clearance of 18 feet. Berths with electricity, gasoline, diesel fuel, water, sewage pump-out, and hull and engine repairs are available at several marinas in the harbor.

Several lighted radio towers E of the mouth of Sturgeon Creek are prominent.

Point Pelee (41°54.5'N., 82°30.6'W.), a peninsula about 34 miles E of the mouth of the Detroit River, projects about 10 miles S into Lake Erie and terminates in a sharp point. Excellent anchorage is available to leeward of the peninsula, but the point has no landing piers or docks. There is deep water within 0.4 mile on both sides of the peninsula, but from the extremity, a very shallow sand and gravel shoal extends S about 2.5 miles and is marked off its outer end by a lighted bell buoy.

East Shoal, Southeast Shoal, and other detached shoals extend the shallow area to a point about 6 miles SSE from the end of Point Pelee. These shoals were previously described with Pelee Passage.

Charts 14820, *2100.–From Point Pelee, the shoreline trends NE to **Pointe aux Pins** (42°15.4'N., 81°51.3'W.), marked by a light. The shoal bank along this stretch extends to 1 mile off near Point Pelee, but elsewhere is close inshore. The land is from 30 to 80 feet high at the middle of the stretch. The distance between the extremity of Point Pelee and Pointe aux Pins is about 42 miles.

Chart *2181.–Wheatley, Ont., is about 12 miles N of Point Pelee at the mouth of **Muddy Creek.** The dredged entrance channel is protected on the E side by a breakwater and on the W side by a wall. A **342°05'** lighted range on the breakwater marks the approach to the harbor; a private fog signal is at the front light. A detached breakwater, marked at its SW end by a light, is about 100 yards SE of the breakwater. Inside the creek, the channel leads upstream for about 0.3 mile. The channels are reported to be maintained at charted depths. Mariners are cautioned that the harbor is subject to silting. In October 1984, shoaling to 4 feet was reported in the entrance channel. A mooring basin on the W side of the channel near the upper end had a controlling depth of 7 feet in 1972.

Omstead Fisheries Co., with its prominent yellow buildings, operates a 440-foot wharf on the E side of the harbor channel. The company has cold storage for 12 million pounds of frozen fish and farm produce. Gasoline, diesel fuel, and engine repairs are available in the harbor for small craft.

Chart *2100.–A danger area of the Cedar Springs Small Arms Range, extending 2.3 miles offshore, is 8.5 miles W of Pointe aux Pins. The intermittent use of the area is announced by local Canadian Coast Guard Marine Radio Broadcasts and may also be advertised in local newspapers. The danger area is marked by buoys. (For details, consult the Annual Edition of Canadian Notices to Mariners.)

Charts 14820, *2100, *2181.–Rondeau Harbour, entered about 3 miles W of Pointe aux Pins, is a shallow bay 6 miles long with a dredged basin at the S end. The harbor is a summer resort, fishing harbor, and important harbor of refuge. **Erieau, Ont.,** is a village on the W side of the dredged basin.

Channels.–The harbor is entered N through a channel between a pier on the E side and a pier and breakwater on the W side to the harbor basin. A light marks the outer end of the E pier, and a **012°40'** lighted range on the W breakwater marks the harbor approach. A fog signal is at the front light. A slip extends 1,800 feet W from the inner end of the W pier, and a small-craft basin for fishing vessels on the NW side of the harbor is protected by a breakwater. In 1980, the controlling depths were 11 feet in the entrance channel except for shoaling to 8 feet at the N corner of the E pier, thence 12 feet in the harbor except for shoaling along the edges, thence 10 feet in the entrance to the small-craft basin with depths of 7 to 9 feet in the basin. The entrance channel is subject to shoaling.

Caution.–SE winds raise the water level in the harbor considerably, and the level lowers rapidly when the wind shifts to SW. During these conditions, currents in the entrance channel may make navigation by small craft hazardous.

Small-craft facilities.–Marinas in Rondeau Harbour provide berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and provisions. A 150-ton marine railway is available in the slip for hull and engine repairs.

Charts 14830, *2100.–From Pointe aux Pins, the shoreline runs N and then NE to Port Stanley, about 43 miles distant. E of Pointe aux Pins, there is good holding ground in mud, gravel, and clay, with some protection from W winds. The offshore bank between the point and Port Stanley varies in width from 0.5 to 1 mile. The shore for almost the entire stretch is a clay bluff generally about 100 feet high. **Patrick Point** and **Plum Point,** 14 and 10 miles SW of Port Stanley, respectively, are prominent.

Caution.–Numerous natural gas wellheads, many marked by buoys, are about 10 to 20 miles ESE of Pointe aux Pins. A submarine gas pipeline, marked by buoys, extends NW from the wellhead area to the shoreline N of Pointe aux Pins. Vessels should not anchor within 0.5 mile of the pipeline or within the area bounded by 42°10'N., 42°15'N., 81°29'W., and 81°41'W.

Chart *2181.–Port Stanley, Ont., is an important harbor of refuge at the mouth of **Kettle Creek,** about midlength of the N shore of Lake Erie. The harbor is a fishing point, summer resort, and receiving port for general cargo, grain, oil, scrap metal, and bulk coal from U.S. ports.

Channels.–The dredged entrance channel leads N from Lake Erie between converging breakwaters to an outer harbor basin, thence between parallel piers at the mouth of the creek to a basin with its upper end about 0.3 mile above the mouth. The entrance channel is marked by buoys, and the outer ends of the E breakwater and W pier are marked by lights. A **341°40'** lighted range on the W breakwater marks the harbor approach. A fog signal and a radiobeacon are at the front light.

The channels are maintained at charted depths. Mariners are cautioned that silting occurs in the harbor.

Above the dredged channel, small craft can navigate for about 1 mile in depths of 3 to 8 feet.

Bridges and cables.–A bascule highway bridge with a clearance of 13 feet crosses Kettle Creek about 0.7 mile above the light on the W breakwater. A fixed railroad bridge just upstream has a clearance of 15 feet. An overhead power cable with a clearance of 14 feet crosses the creek just above the railroad bridge.

Caution.–S winds cause heavy surge within the harbor. Small craft are cautioned to seek shelter above the highway bridge. When proceeding through the bridge, craft should keep to midchannel as pilings and ruins are at the W and E abutments, respectively.

A **Canadian customs vessel reporting station** is at Port Stanley.

Wharves.–Deep-draft facilities are on either side of Kettle Creek. The 2,000-foot W pier has 9,000 square feet of covered storage and a 55,000-bushel grain elevator. The 1,100-foot E pier has coal storage and several fish-processing plants. Vessels drawing up to 19 feet discharge in the inner harbor.

Small-craft facilities.–Marinas above the highway bridge provide berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, and sewage pump-out. A 50-ton hoist is available for hull and engine repairs.

Charts 14820, *2100.–From Port Stanley, the shoreline trends E for 10.5 miles to Port Bruce and thence 10.5 miles E to Port Burwell. The bold shore decreases from 140 feet in height at Port Stanley to 110 feet at Port Bruce and thence to 80 feet at Port Burwell. A water tank about midway between Port Bruce and Port Burwell is prominent.

Caution.–Numerous gas wellheads and pipelines are in Canadian waters SE of Port Stanley. A submarine gas pipeline, marked by a lighted buoy in about 42°32'53"N., 80°58'13"W., extends NW from the wellhead area to Port Stanley. Vessels should not anchor within 0.5 mile of the pipeline or within the area bounded by the International boundary, 42°35'N., 80°28'W., and 81°05'W.

Port Bruce, Ont., is a small harbor at the mouth of **Catfish Creek,** halfway between Port Stanley and Port Burwell. The entrance channel to the harbor is between parallel piers at the mouth of the creek, with the outer end of the W pier marked by a light. In 1972, the controlling depths were 6 feet between the piers and 1 to 6 feet in the small basin inside the mouth of the creek. Submerged pilings are off the end of the E pier; caution is advised. SW winds cause considerable turbulence in the shallow approach to the harbor and make entering difficult. Berths, gasoline, and water are available at a marina in the creek.

Chart *2181.–Port Burwell, Ont., at the mouth of **Big Otter Creek** 21 miles E of Port Stanley and 40 miles W of Long Point, is an important fishing harbor and harbor of refuge for small craft. An abandoned lighthouse on the E side of the harbor is prominent.

Channels.–The approach to the harbor is protected by a breakwater that extends S from the W side of the creek mouth. A dredged channel on the E side of the breakwater leads between piers at the mouth of the creek upstream for about 0.6 mile. A light marks the outer end of the breakwater and E pier; a light with a fog signal marks the outer end of the W pier. In 1974, the entrance channel had a controlling depth of 10 feet. Inside the piers, the harbor is maintained to a depth of 8 feet, but is subject to silting.

SW winds cause turbulence in the approach to the harbor.

Small-craft facilities.–Docking space is along both sides of the inner harbor, but no supplies or services are available.

Charts 14820, *2100.–The shore is high and sandy from Port Burwell SE for 10 miles. Two conspicuous sand hills, the easternmost being 190 feet high, are about 10 miles ESE of Port Burwell. Thence the shoreline extends 10 miles E to the neck of Long Point.

Charts 14820, *2100, *2101, *2110.–Long Point (42°33'N., 80°05'W.) is a narrow peninsula about 20 miles long, connected to the mainland at its W end by a narrow neck. The peninsula is generally low and marshy with a few sand hills 20 to 60 feet high on the S side at the E end. The 18-foot contour is 0.5 to 1 mile off the S shore of the point.

Calling-in point.–A St. Lawrence Seaway traffic control calling-in point is 5 miles SSE of the E end of Long Point. Contact is on VHF-FM channel 11 (156.55 MHz); call, "Seaway Long Point." (Consult the Seaway Handbook for details.)

Long Point Light (42°32.9'N., 80°03.0'W.), 97 feet above the water, is shown from a white octagonal tower, upper portion red, on the E end of the point. A fog signal and radiobeacon are at the light.

Long Point Bay is a broad open bay enclosed on the S by Long Point. Its mouth is about 17 miles wide between the E end of Long Point and the mainland N. Shallow water extends as much as 1.5 miles from the shores of the bay, but the central part has depths of 24 to 50 feet.

Caution.–An extensive network of submerged natural gas pipelines and well heads is in Long Point Bay and Inner Bay. The well heads extend as much as 5 feet above the natural bottom, and the pipelines are under pressure. Damage to these structures would create an immediate fire hazard. Vessels anchoring should exercise extreme caution to keep clear of these structures.

In May 1984, a sunken wreck covered 15 feet was reported about 7.8 miles NW of Long Point Light in about 42°36'56"N., 80°09'54"W.

Bluff Point, on the N side of Long Point about 4.5 miles WNW of Long Point Light, juts into the S side of Long Point Bay. **Bluff Bar** is a sandspit extending about 2.5 miles NW from the point. Buoys mark the extent of the shoals that extend off the NW end of the bar. Good anchorage in 18 to 20 feet, mud bottom, is on the S side of Bluff Bar, but caution is advised in the approach, because the depths shoal rapidly on three sides. From Bluff Bar around the head of Long Point Bay to Port Dover, orange spar buoys, about 1 to 3 miles offshore, mark the limits of a fishing area. Commercial fishing is prohibited between these buoys and the shore.

Inner Bay, a shallow recess on the N side of Long Point at the SW corner of Long Point Bay, is entered through a marked channel between **Turkey Point** on the NW and **Pottohawk Point** on the SE. In 1973, the controlling depth in the channel was 4 feet. Depths in the central part of Inner Bay are 5 to 10 feet with rapid shoaling toward shore. A marked obstruction, covered 1 foot, is in the N part of the bay in about 42°38'36"N., 80°23'30"W.

Port Rowan, Ont., is a village on the W side of Inner Bay, about 21 miles W of Long Point Light. A Government wharf, marked on the outer end by a light, extends about 1,000 feet into the bay, and a slip on its NE side is protected by a parallel breakwater. In 1966, the controlling depth in the buoyed channel leading to the wharf was 3 feet, thence in 1965, 6 feet in the slip. Two marinas provide berths, gasoline, water, ice, marine supplies, sewage pump-out, and a 4-ton hoist for engine repairs.

St. Williams, Ont., is a small village on the N side of Inner Bay about 3 miles NE of Port Rowan. Marinas at the village provide transient berths with electricity, gasoline, water, sewage pump-out, and a 12-ton hoist for hull and engine repairs.

From Turkey Point NE for about 12 miles to Port Dover, the W shore of Long Point Bay changes from low and marshy to a high sandy cliff.

Charts *2181, *2110.–Port Dover, Ont., on the N shore of Long Point Bay at the mouth of the **Lynn River**, is a base for fishing and recreational craft. A lighted 199-foot water tank 1.1 miles NW of the river mouth is prominent.

Channels.–The entrance channel leads NNE between two piers to a turning basin at the inner end of the piers. A light marks the outer end of the E pier, and a **021°25'** lighted range on the W pier marks the approach to the harbor. A fog signal and radiobeacon are at the front light. The entrance channel has depths of 8 feet between the piers and 8 feet in the turning basin. Above the turning basin, a depth of about 7 feet can be carried in the Lynn River to the yacht club at the junction with **Black Creek.** A fish tug basin on the SE side of the entrance channel is entered through a break in the E pier. The basin has depths of about 7 feet.

Dangers.–A submerged pier, with sections awash, extends about 700 feet into the lake just W of the W pier. A shoal with a least depth of 1 foot extends about 0.7 mile SE from the outer end of the E pier. A small islet, 1 foot high, is near the outer end of the shoal. An unmarked 7-foot spot is 1.2 miles SE of the E pier. A lighted buoy marks a 16-foot spot 1.7 miles SE of the E pier.

Bridges.–A bascule highway bridge with a clearance of 24 feet crosses Lynn River about 0.4 mile above the mouth.

A **Canadian customs vessel reporting station** is at Port Dover.

A **speed limit** of 3.5 mph (3 knots) is enforced in the harbor.

Small-craft facilities.–The Government wharf on the W side of the turning basin at the inner end of the W pier has depths of 8 to 9 feet alongside. During S winds, there is considerable swell along this wharf and berthing may be untenable. Marinas at Port Dover provide berths with electricity, gasoline, diesel fuel, water, ice, sewage pump-out, and marine supplies. A 20-ton marine railway is available for hull and engine repairs.

Charts 14820, *2100, *2101, *2110.–From Port Dover E for about 32 miles to Port Maitland, the shoreline is a series of small points, and the shoal border is irregular.

Nanticoke Harbour is 7 miles E of Port Dover at the mouth of **Nanticoke Creek.** The entrance channel to the harbor is between two breakwaters. A light on the outer end of the S breakwater and a directional light with a private fog signal on the E side of the mouth of the creek mark the harbor approach. In 1975, the controlling depths were 2 feet in the entrance channel and 4 feet in the harbor basin, but the harbor is subject to silting. A marina in the harbor provides berths, gasoline, water, and electricity.

A seasonal **Canadian customs vessel reporting station** is in the harbor.

Nanticoke Shoal, with a least depth of 6 feet, is the only detached shoal in Long Point Bay, 4 miles S of Nanticoke Creek and 13 miles N of Long Point Light. A lighted bell buoy marks the SE side of the shoal. A spoil area is N of the shoal and a submerged wellhead is close W of the lighted buoy.

Long Point Bay Light Buoy, 3 miles SW of Nanticoke Shoal, marks the approach to the Nanticoke Generating Station channel.

Nanticoke Generating Station is 1 mile E of Nanticoke Creek. Two floodlighted 668-foot chimneys at the station and a lighted 298-foot microwave tower 0.2 mile N are prominent. A dredged approach channel, marked by lighted buoys and a **043°** lighted range, leads from the W side of Nanticoke Shoal NE for about 4 miles, then turns NNW, marked by buoys and a **343°** lighted range, to a 1,000-foot berthing slip. In 1980, the reported controlling depth to the slip was 29 feet. Coal is discharged at the berth on the E side of the slip. In 1980, the reported depth alongside was 27 feet.

Caution.–Several submerged gas pipelines cross the entrance channel; mariners are cautioned not to drag anchor.

About 2 miles above the entrance to the channel, a dredged side channel, marked by lighted buoys and a private **342°30'** range, leads N to the ore unloading wharf at the Steel Company of Canada plant. The 4,000-foot-long wharf is marked by a private light at its outer end. In 1980, the side channel had a reported controlling depth of 29 feet. A submerged wellhead projecting about 6½ feet above the bottom was reported on the E side of the channel in about 42°46'01"N., 80°04'06.7"W.

At **Peacock Point** (42°47.5'N., 79°59.0'W.), 3 miles E of the Nanticoke Generating Station, a reef with 7 feet at its outer end extends about 3.5 miles SW, to within 2 miles of Nanticoke Shoal. **Sandusk Creek** is 1.8 miles NE of Peacock Point. In 1978, part of the channel leading into the creek was reported bare at chart datum. Stakes mark the navigable part of the channel. Berths with electricity, gasoline, water, sewage pump-out facilities, a boat hoist, and hull and engine repairs are available at a marina in the creek.

Charts 14820, *2100, *2101.–From Peacock Point E for about 12.3 miles past **Hoover Point** and **Featherstone Point** to **Evans Point**, vessels other than small craft should keep 1.5 miles offshore because of the numerous submerged rocks and detached shoal spots. From **Blott Point** and **Low Point**, about 4 miles E of Evans Point, a group of shoals extends 4 miles SW. **Tecumseh Reef**, at the outer end of the group, has a least depth of 4 feet and is marked on the S side by a lighted buoy. At **Grant Point** (42°50.0'N., 79°38.3'W.), shoals extend 1.5 miles SSW.

Charts *2101, *2181.–Port Maitland, Ont. is a harbor at the mouth of **Grand River**, 34 miles W of the Niagara River. Grand River empties into the head of **Connor Bay**, the bight formed between Grant Point on the W and **Rock Point** on the E.

Channels.–A dredged channel leads NNE between parallel piers at the mouth of Grand River upstream for 0.9 mile. A light marks the outer end of the E pier, and a **020°45'** lighted range on the W pier marks the harbor approach. A fog signal is at the front light. The channel is reported to be maintained at charted depths. An 18-foot spot is off the end of the W pier. The channel between the piers and in the harbor is maintained to 22 feet, but is subject to silting. A rock, covered 15 feet, is on the W side of the entrance channel 800 feet NNE of the outer end of the W pier.

Above the dredged channel, Grand River is navigable to the dam at **Dunnville, Ont.**, about 5 miles above the mouth. A depth of 14 feet can be carried to within 1 mile of Dunnville, thence 6 feet to the dam, but local knowledge is needed to carry 10 feet beyond halfway to Dunnville. An unmarked 2-foot shoal is in midriver 3.5 miles above the mouth.

Caution.–S or SW winds cause water to surge into Grand River. With a wind shift to NW, a strong current flows out of the harbor and makes it difficult to enter.

Wharves.–The Canada Coal Co. operates berths on both sides of the slip about 0.8 mile above the mouth of the river. The berths on the NW and SE sides of the slip are 700 feet long. In 1979, the controlling depths were 13 feet in the approach with 15 to 18 feet inside the slip.

Small-craft facilities.–A Government wharf is at Dunnville, where gasoline, water, provisions, and repairs are available.

Chart *2101.–Between Port Maitland and Port Colborne, about 17 miles E, the shore continues broken by points with irregular shoals extending from them. **Mohawk Island** is a small island about 3.3 miles SE of Port Maitland and about 1.2 miles off Rock Point. A 65-foot abandoned lighthouse on the island is prominent. Shoals and submerged rocks extend 0.2 mile N and 1 mile SE from the island. A lighted buoy is off the S end of the shoals. Mohawk Island is in the entrance to **Mohawk Bay**, a shallow bight enclosed by **Rock Point** on the W and **Mohawk Point** (42°45.6'N., 79°28.9'W.) on the E. A depth of 9 feet can be carried through Mohawk Bay by holding midway between Mohawk Island and the shore. **Moulton Bay** forms just E of Mohawk Point. Its W shore is shoal for about 0.5 mile off, and a very shallow reef extends 1 mile S from the small unnamed point 3.4 miles NE of Mohawk Point which forms the E side of Moulton Bay. Moulton Bay provides fairly good anchorage with protection from W winds, clay bottom with boulders and gravel in places. A shallow reef extends S from **Grabell Point**, 5.3 miles ENE of Mohawk Point. **Morgans Point**, 7 miles E of Mohawk Point, is conspicuous by its sand knolls. Vessels entering Moulton Bay or the bays on either side of Grabell Point are cautioned to follow the chart closely and avoid the shoals extending off the points.

Charts *2101, 14822, *2042.–Sugar Loaf Point, 3.7 miles E of Morgans Point, is a low rocky point forming the W side of **Gravelly Bay**, in which the outer harbor of Port Colborne has been constructed. An isolated 140-foot tree-covered knoll 0.5 mile NW of Sugar Loaf Point is prominent.

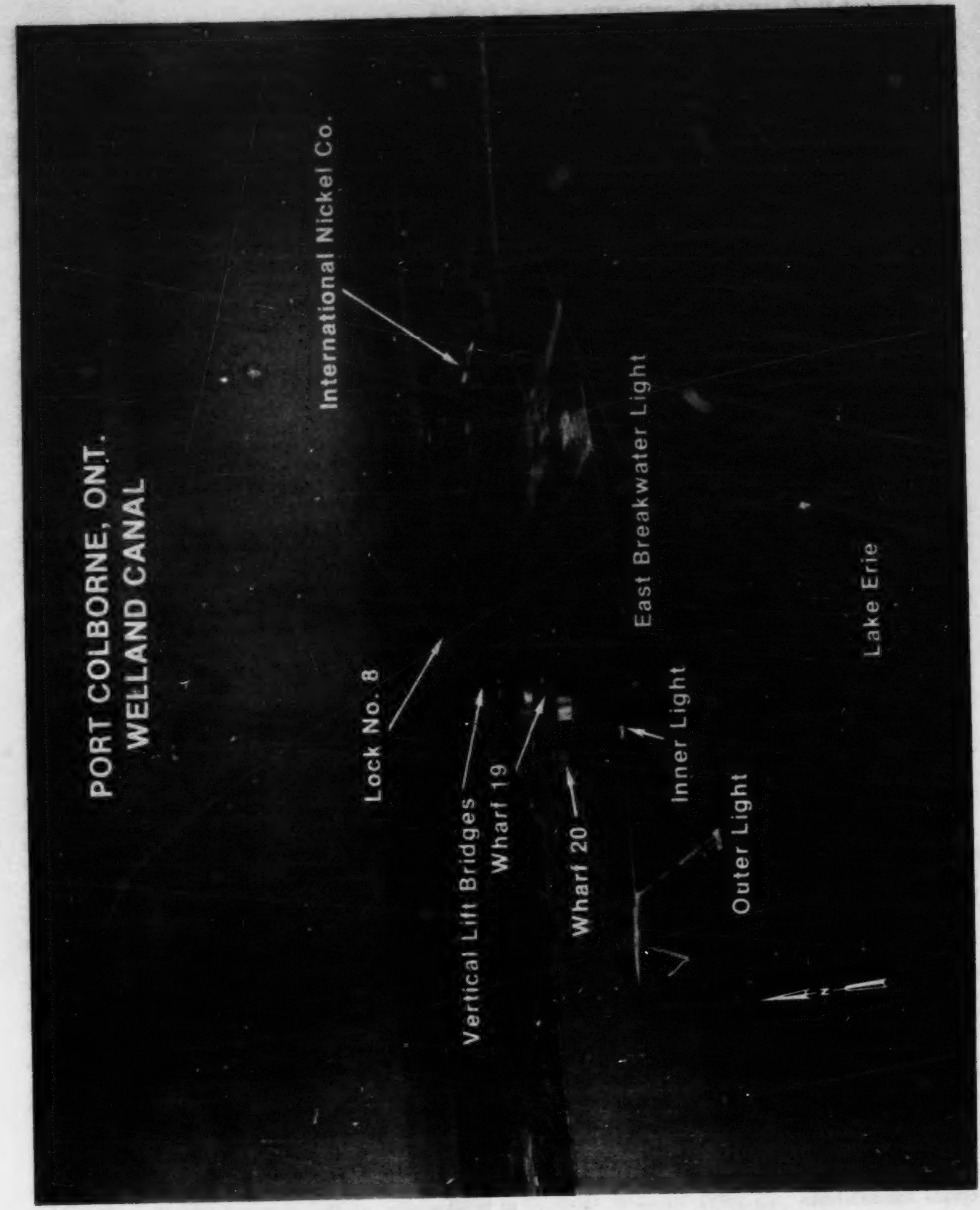
Port Colborne, Ont., about 17 miles W of the Niagara River, is the Lake Erie entrance to the **Welland Canal**. The port is also an important commercial harbor. The principal commodities handled are petroleum products, grain, iron ore, sand, gravel, stone, pig iron, and cement.

Calling-in point.–Vessels approaching Port Colborne from Lake Erie shall contact "Seaway Welland" on VHF-FM channel 14 (156.70 MHz) upon arrival at the lighted buoy 3 miles SW of Port Colborne entrance channel and inform the traffic controller of their destination. After initial contact, vessels transiting the Welland Canal shall guard VHF-FM channel 14 (156.70 MHz). (See the Seaway Handbook for details.)

Prominent features.–Two grain elevators on the W side of the harbor and numerous stacks on the E side are prominent from Lake Erie.

Port Colborne Inner Light (42°52.1'N., 79°15.2'W.), 50 feet above the water, is shown from a white square tower on the E end of the W breakwater. A fog signal, a radiobeacon, and a ship calibrating radiobeacon are at the light. (See Canadian Radio Aids to Marine Navigation for details.)

Channels.–The harbor is entered through a dredged channel that leads N between converging breakwaters to the harbor basin. **Port Colborne Lighted Bell Buoy E** (42°49.4'N., 79°17.0'W.) marks the approach to the harbor. A S extension of the W breakwater protects the W side of the entrance



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channel. Lights mark the ends of breakwaters and the extension. The E channel limit is marked by lighted and unlighted buoys. The dredged channel leads through the harbor basin to the head of the Welland Canal, and thence into the Welland Canal to Lock 8. The entrance channel and the channel through the harbor basin have been dredged to 30 feet. A 22-foot shoal is in the entrance channel off the end of the W breakwater extension, and depths less than 30 feet are along the channel edges on both sides. The controlling depth in the Welland Canal is 27 feet with a maximum permissible draft of 26 feet.

The harbor basin W of the main channel has been dredged to provide access to the wharves on the W side of the basin. The least depth is 15½ feet except for the W part, which has a least depth of 19 feet leading to the W side of the Government wharf and grain elevator. A detached breakwater parallels and protects the W side of the Government wharf. Buoys mark the W limit of the dredged area. W of the dredged basin, Gravelly Bay is generally shallow with obstructions near shore and along the N side of the W breakwater.

Anchorages.–A prohibited anchorage is in the approach to Port Colborne and the Welland Canal. The prescribed anchorage for vessels awaiting berth in Port Colborne or permission to transit the Welland Canal is centered 5 miles S of Port Colborne Inner Light, immediately SE of the prohibited anchorage.

Caution.–An unmarked **dumping ground** with unknown depths is just N of the prescribed anchorage.

Towage.–The use of tugs is not compulsory for docking. When necessary, tug service can be arranged from Buffalo.

Port Colborne is a **Canadian customs port of entry.**

A **speed limit** of 6 knots is enforced in Port Colborne and the Welland Canal, except in the Welland By-Pass Channel from Rameys Bend to Port Robinson where the maximum speed is 8 knots. (See Welland Canal Regulations, chapter 5.)

Wharves.–Port Colborne has several deep-draft facilities in the harbor basin and along both sides of the Welland Canal. Facilities below Lock 8 are described under Welland Canal in chapter 5. The alongside depths given for the facilities described are reported depths.

Maple Leaf Mills Wharf No. 19: W side of harbor basin; E side 900 feet long; 17 to 20 feet alongside; 2¼-million-bushel grain elevator.

National Harbours Board Wharf No. 20: across slip W of Maple Leaf Mills Wharf No. 19; 900-foot W side, 19 feet alongside; 3-million-bushel grain elevator.

Fueling Berths, Wharf No. 18: W side of the entrance to Welland Canal; 1,650 feet of berthing space; 27 feet alongside; diesel fuel and coal bunkering of vessels.

Canadian Furnace Wharf No. 17: E side of the entrance to Welland Canal; 1,120 feet of berthing space; 27 feet alongside; storage for 250,000 tons of material; receipt of ore and limestone, shipment of pig iron and scrap.

Rochester and Pittsburg Coal Co. Wharf No. 16: immediately N of Canadian Furnace Wharf No. 17; 1,480 feet of berthing space; 27 feet alongside; storage for 30,000 tons of material; stone and diesel fuel are handled.

Port Colborne Wharf No. 15: W side of Welland Canal about 0.8 mile above the entrance; 850-foot face; 14 feet alongside; receipt of sand.

Supplies.–Water, bunker fuels, provisions, and ships stores are available at Port Colborne.

Repairs.–Several firms at Port Colborne make ship repairs. (For information on these firms, contact the St. Lawrence Seaway Authority. See appendix for address.)

Small-craft facilities.–Marinas in the NE part of Gravelly Bay provide berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, and sewage pump-out. A 12-ton hoist is available for hull and engine repairs.

Communications.–Port Colborne has good highway and rail connections.

Charts *2042, 14822.–The Welland Canal, from Lock 8 to Lake Ontario, is described in chapter 5.

Charts 14822, 14832.–At **Cassaday Point,** 1.8 miles E of the entrance to Port Colborne, a shoal with numerous submerged rocks extends 1 mile S and is marked by a lighted buoy 2 miles S of the point.

No Anchorage Area.–Due to gas wells and pipelines on the lake floor S and SE of Port Colborne, a prohibited anchorage area has been established, bounded as follows: 42°51'30"N., 79°10'30"W.; 42°49'40"N., 79°10'30"W.; 42°39'30"N., 70°23'00"W.; 42°45'40"N., 79°07'00"W.; 42°49'15"N., 79°07'00"W.; 42°49'15"N., 79°09'00"W.; 42°51'30"N., 79°09'00"W.; thence to the point of beginning.

Between Cassaday Point and Point Abino, 6.5 miles E, shallow water extends from 0.5 to 1 mile offshore. **Point Abino** is the extremity of a peninsula that extends 2 miles S from the mainland. The point attains a height of about 100 feet near the S end, and shoals extend 0.5 mile off the point. **Point Abino Light** (42°50.1'N., 79°05.8'W.), 83 feet above the water, is shown from a white square tower at the S end of the point. A fog signal is at the light.

Abino Bay is the shallow sandy bight formed on the E side of Point Abino. Anchorage in the bay is good in all but E to S winds, sand bottom. Avoid anchoring near the water intake on the NE side of the bay. Several small-craft facilities are on the W side of the bay. A yacht club here can haul out craft to 41 feet for emergency hull and engine repairs. A seasonal **Canadian customs vessel reporting station** is on the W side of the bay.

Crystal Beach, Ont., is a summer resort on the N side of Abino Bay. A wharf at the village is not maintained and is barricaded at the shore end.

From Crystal Beach to the head of the Niagara River, the shoreline is a series of small points and recessions. Shoals and submerged rocks extend about 0.6 to 1.5 miles offshore with the greatest extent being SE of Windmill Point, about 5 miles ENE of Point Abino. Two unmarked rocks awash are about 0.4 mile E of Windmill Point.

7. DETROIT RIVER

Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to the sloping surface of the river corresponding to a Lake St. Clair stage of 571.7 feet and a Lake Erie stage of 568.6 feet above mean water level at Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955), which elevations are the planes of Low Water Datum for the two lakes. (See Chart Datum, chapter 1.)

General description.–**Detroit River** is about 32 miles long from Detroit River Light at its mouth in Lake Erie to Windmill Point Light at the head of the river at Lake St. Clair.

The lower part of the river is broad and is filled by many islands and shallow expanses. The river banks in this part are more flatly sloping than those in the upper river. The river bottom is generally earth and boulders, except for a section of bedrock and boulders about 6 miles N of the lower end of Bois Blanc Island. Extensive rock excavation and dredging have been necessary to provide channels for deep-draft vessels.

The upper 13 miles of the river is a single deep channel, except at its head where it is divided by Peach Island and Belle Isle. The river banks in this stretch are quite steep, and the bottom is earth.

Channels.–Two dredged channels lead from Lake Erie to the mouth of Detroit River. East Outer Channel, a two-way passage, extends NNW from the lake to Detroit River Light. West Outer Channel passes W of the light and provides a passage for vessels of moderate draft bound for Monroe or Toledo.

Above Detroit River Light, lower Livingstone Channel is a two-way passage to the junction with Amherstburg Channel. From the junction, the two channels extend N to the junction with Ballards Reef Channel, Amherstburg Channel for upbound traffic and Livingstone Channel for downbound traffic. Ballards Reef and Fighting Island Channels lead from the upper junction of Amherstburg and Livingstone Channels to the N end of Fighting Island. From here, natural deep water can be carried to the upper end of Belle Isle, thence a dredged channel leads to Lake St. Clair.

The channels through the river are well marked by lights and buoys.

Anchorage.–Numerous submerged pipelines and cables are in Detroit River. Vessel masters are advised to exercise caution when coming to anchor in the river.

Fluctuations of water level.–Each year the normal seasonal fluctuations produce a difference of about 2 feet between the highest and lowest monthly mean levels in the river. However, strong E or W winds can raise or lower, respectively, the water levels in the W end of Lake Erie and in the lower Detroit River by as much as 6 feet within 8 hours. Atmospheric pressure changes may cause temporary water level fluctuations of 1 foot or more.

On the 5th and 20th of each month the District Engineer, Corps of Engineers, Detroit, publishes a bulletin of the predicted range of water levels. (See appendix for address.)

Water level information for the Gibralter area may be obtained by contacting Detroit Coast Guard Group on VHF-FM channel 16 (156.80 MHz). The information is given in whole inches above or below chart datum. In addition, Detroit Group at the end of the scheduled radio broadcast notice to mariners (see schedule in the appendix) includes this information.

Currents.–The following currents are based on the averages of water flow through the entire cross section of the river, that is, from bank to bank and from the surface to the bottom during normal water flow conditions. Normal water flow conditions are encountered when there is no wind, Lake St. Clair is at a stage of 573.3 feet, and the lower Detroit River (Lake Erie) stage is 570.4 feet above mean water level at Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955), that is 1.6 feet and 1.8 feet above their respective Low Water Datums. The current encountered at midstream is usually about 1.5 times the average velocity. Greater velocities may be expected when the difference between the lake levels is greater, or when lake stages are higher.

Currents for the following locations on the Detroit River are given at high water flow of 210,000 cubic feet per second (cfs), medium water flow of 184,000 cfs, and low water flow of 170,000 cfs, respectively.

Livingstone Channel Upper Entrance Light: 0.8 mph (0.7 knots), 0.7 mph (0.6 knots), and 0.7 mph (0.6 knots)

Fighting Island Channel North Light: 1.5 mph (1.3 knots), 1.5 mph (1.3 knots), and 1.4 mph (1.2 knots)

1.7 miles below the Ambassador Bridge: 1.6 mph (1.4 knots), 1.4 mph (1.3 knots), and 1.3 mph (1.2 knots)

Lower end of Belle Isle: 1.4 mph (1.2 knots), 1.3 mph (1.1 knots), and 1.2 mph (1.0 knot)

Peche Island Light: 1.5 mph (1.3 knots), 1.4 mph (1.2 knots), and 1.2 mph (1.1 knots).

Weather.–Strong winds are most likely during fall and early spring. However, extremes often occur in squall lines or thunderstorms. Detroit has recorded a SW wind at 75 knots and an 83-knot wind from the NW; both occurred in June. At Windsor, the maximum sustained wind was 49 knots in March; an 81-knot gust was once recorded. Winds along the river blow mainly out of the SW and W, but others are common. In spring and summer, N through E winds are frequently encountered as are northwesterlies and southerlies in fall and winter.

Ice.–The lower part of the Detroit River, below Fighting Island, is generally shallow and has the same freezing characteristics as the W end of Lake Erie, forming an average thickness of 7 inches and an average maximum thickness of 11 inches. This ice generally starts to clear by mid-March because of the temperatures and the prevailing W winds. The upper part of the river is generally ice free except for shore ice and occasional drift ice. However, as a track is opened through Lake St. Clair, the broken ice will accumulate in the river above the natural ice cover in the lower part of the river. (See Winter Navigation, chapter 3.)

Navigation regulations.–A vessel traffic reporting system and related navigation regulations have been established for the connecting waters from Lake Erie to Lake Huron. (See **33 CFR 162.130 through 162.140**, chapter 2, for regulations.)

Vessel Traffic Service.–The Canadian Coast Guard operates a Vessel Traffic Service in Canadian waters from Long Point in Lake Erie through the Detroit and St. Clair Rivers to De Tour Reef Light in Lake Huron. (See chapter 3 and the Annual Edition of Canadian Notices to Mariners for complete information.)

Pilotage.–The waters of the Detroit River are Great Lakes designated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. Registered pilots for the Detroit River are supplied by Lakes Pilots Association. (See appendix for address.) Pilot exchange points are 1 to 2 miles S of Port Colborne in Lake Erie, just below the Ambassador Bridge in Detroit River, and off Port Huron at the head of St. Clair River in about 43°05'30"N., 82°24'42"W. The pilot boat in the Detroit River, J. W. WESTCOTT II, has a black hull encircled by an orange band and a white cabin with the words "U.S. Mail" in black letters. Three pilot boats are at Port Huron: HURON BELLE has an international orange hull with an aluminum cabin, and HURON MAID and HURON LADY each have an international orange hull with a white cabin. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

Principal ports.–The principal ports on the Detroit River are at Trenton, Wyandotte, and Detroit, Mich., and Windsor, Ont. Deep-draft facilities have been developed throughout the length of the river.

Charts 14830, 14848, 14849, 14853, 14854.– The **Detroit River** flows S from Lake St. Clair and empties into the NW end of Lake Erie.

Detroit River Light (42°00.1'N., 83°08.5'W.), 55 feet above the water, is shown from a white conical tower, upper part black, on a hexagonal pier in 20 feet of water at the mouth of the Detroit River at the junction of East and West Outer Channels. A fog signal and a radiobeacon are at the light. A radar beacon (Racon) is operated during the winter. (See Racons chapter 1, for additional information.)

Channels.–**East Outer Channel** and **West Outer Channel**, dredged and well marked by buoys, lead northward through the shallows at the upper end of Lake Erie to the mouth of the Detroit River. Immediately N of Detroit River Light, the channels merge to form lower Livingstone Channel. In 1983-September 1984, East Outer Channel had a controlling depth of 26 feet for a midwidth of 700 feet. In 1980, West Outer Channel had a controlling depth of 15 feet for a midwidth of 700 feet.

East Outer Channel is a two-way passage. West Outer Channel may be used by downbound vessels whose drafts permit. (See **33 CFR 162.130, through 162.140**, chapter 2, for regulations.) East Outer Channel Lighted Buoy 1 is equipped with a radar transponder beacon (Racon). (See Racons, chapter 1, for additional information.)

From Detroit River Light, lower Livingstone Channel provides for two-way traffic to the lower junction of Amherstburg Channel and upper Livingstone Channel, 1.5 miles SW of Bar Point, the E entrance point to the river. In 1981-August 1982, the controlling depth was 27 feet for a midwidth of 900 feet.

An unmarked temporary **dumping ground** is in the approach to the Detroit River between East and West Outer Channels.

Small-craft facilities.–Numerous marinas on the Detroit River and adjacent waters provide gasoline, diesel fuel, water, ice, electricity, marine supplies, sewage pump-out, railway and hoists to 250 tons and 150 feet. A launching facility for craft to 34 feet is on the waterway N of Belle Isle.

Charts 14830, 14848, 14849, 14846.–**Huron River** empties into the NW end of Lake Erie through the marshes on the W side of the mouth of the Detroit River. Depths are about 2 feet over the bar, thence 5 to 10 feet in the lower part of the river. A fixed highway bridge with a clearance of 11 feet crosses the river about 1.8 miles above the mouth. An overhead power cable on the W side of the bridge has a clearance of 38 feet. A **slow-no wake speed** is enforced on the Huron River. A marina on the S side of the river below the highway bridge provides gasoline, water, electricity, sewage pump-out, a launching ramp, and a 6-ton crane.

Charts 14848, 14849, 14853.–In the lower part of the Detroit River, from SW of Bar Point N for about 7 miles, the dredged channel divides into upbound and downbound channels. The upbound channel E of Bois Blanc Island comprises Amherstburg Channel and the lower mile of Ballards Reef Channel. The downbound channel is Livingstone Channel, W of Bois Blanc Island.

Amherstburg Channel comprises three reaches. **Hackett Reach** extends about 3.7 miles NE from the junction with Livingstone Channel to the lower end of Bois Blanc Island, thence **Amherstburg Reach** extends about 1 mile to the upper end of Bois Blanc

Island, and thence **Limekiln Crossing Reach** extends about 1.2 miles to the junction with **Ballards Reef Channel.**

The channel through each of the reaches is 600 feet wide. The W half of the channel is the deep-draft channel and is separated from the E or light-draft channel by lighted buoys. The Federal project depth in the W half of the channel is 28½ feet in Hackett Reach and 27½ feet in Amherstburg and Limekiln Crossing Reaches with 21 feet in the E half through the entire channel. The channel is maintained at the project depths except in the lower section of Hackett Reach from its junction with Livingstone Channel to the revetment extending S from Bois Blanc Island. In 1981-August 1982, the controlling depths were 27 feet for a midwidth of 150 feet in the W half and 20 feet for a midwidth of 200 feet in the E half.

The channel is well marked by lights and lighted and unlighted buoys. The deep-draft channel is marked by a lighted range in each reach.

Because of current effects, mariners are advised to exercise caution when turning from Hackett Reach into Amherstburg Reach.

Anchorage.–Care should be exercised when anchoring in Amherstburg Channel between its upper end and the S end of Bois Blanc Island. The current in this area may cause the anchor to drag and overturn rocks, which may then become obstructions. Dragging can probably be lessened or entirely avoided by paying out sufficient length of chain before strain is brought to bear on the anchor.

Canadian regulations specify a **speed limit** of 8 knots for vessels of 15 gross tons and over in Amherstburg Channel.

The upper part of **Livingstone Channel,** passing E of the lower half of Grosse Ile and W of Bois Blanc Island, is about 6.7 miles long from its N entrance at Ballards Reef Channel to its S junction with Amherstburg Channel 1.5 miles SW of Bar Point. This section of Livingstone Channel is for downbound vessels except that traffic becomes two-way under certain winter conditions designated by the Commander, Ninth Coast Guard District. (See **33 CFR 162.130, through 162.140,** chapter 2, for regulations.) Most of the channel is revetted on both sides with rock excavated from the channel. Most of the revetment is low and wooded.

The channel is well marked with lights and buoys. **Ballards Reef Channel Light 81D** marks the W side of the downbound turn into the entrance to Livingstone Channel at its junction with Ballards Reef Channel. Because of the strong E set of the current at the junction of Livingstone and Ballards Reef Channels, mariners are advised to favor the W channel edge.

N from its junction with Amherstburg Channel to the lower end of the channel revetments, Livingstone Channel has a Federal project depth of 29 feet. In 1979-October 1981, the controlling depth in this section was 25 feet for a midwidth of 400 feet. Above the lower end of the channel revetments to the junction with Ballards Reef Channel, Livingstone Channel is maintained at its project depth of 27 feet.

Canadian regulations specify a **speed limit** of 10 knots in Livingstone Channel for vessels of 500 gross tons and over.

Various forms of submerged and exposed compensating dikes extend to the W from the W channel revetment, connecting with Stony Island in the N part and extending to within about 400 feet of Sugar Island at the midpoint of the channel.

Bois Blanc Island, popularly known as Bob-Lo Island, is in the lower part of the Detroit River, close to the Canadian mainland and separated from it by Amherstburg Channel. The island is a large amusement park. A marina on the W side of the island has water and electricity. Ferries connect the island with Amherstburg, Ont., and Detroit, Mich.

Caution.–Numerous small craft have reported striking two submerged obstructions between the W side of Bois Blanc Island and the Livingstone Channel revetment; caution is advised.

Amherstburg, Ont., a town on the E side of the Detroit River opposite Bois Blanc Island, is a **Canadian customs vessel reporting station.** The Government wharf at Amherstburg is 250 feet long and has a large warehouse. The Department of Transport wharf close N is 291 feet long. The Amherst Fuel and Supply Limited wharf, 500 feet long, is used for coal. Amherstburg has several other small wharves; water is available. The area between Amherstburg Channel and the dock frontage has been dredged to 15 feet.

Except within the dredged deep-draft channels, a **speed limit** of 7 knots is enforced within 1,000 feet of the shore within the limits of Amherstburg, E of the International boundary from Lake Erie N to Fighting Island North Light.

Four radio masts N of Amherstburg in about 42°08.8'N., 83°05.5'W. are prominent. They are reported to be visible from Point Pelee in Lake Erie to Lake St. Clair.

The lower part of the Detroit River W of Livingstone Channel is open and generally shallow with several small islands. Natural channels with depths of about 13 feet and less, marked by buoys, provide access for small craft.

W of the lower end of the revetments in Livingstone Channel, a small-craft channel marked by buoys leads from the open part of the lower Detroit River between **Sugar Island** and **Meso Island,** along the Grosse Ile shore, and thence W of **Stony Island.** In the narrow part of this channel between Stony Island and Grosse Ile, a line of submerged bridge abutments, with least depths of ½ foot, crosses the channel, and submerged cables follow the same path just to the S and N of the abutments. A buoy marks the W side of the westernmost abutment, and in 1977, the best water was inside the buoy within 150 to 200 feet of the Grosse Ile shore. The W abutment is about 280 feet from shore.

Sugar Island Cut, about 400 feet wide, is an opening between the E side of Sugar Island and a compensating revetment that extends W from the W revetted wall of Livingstone Channel.

Hole-in-the-Wall, W of the N end of Bois Blanc Island, is a 0.2-mile-wide gap in the revetted walls of Livingstone Channel that allows small craft to cross the main channel to the Canadian side of the Detroit River. A strong SW current flows through Hole-in-the-Wall; caution is advised.

Protective riprap extends out 30 feet from the base of the light marking the N end of the W revetment on the S side of Hole-in-the-Wall. The structure should not be passed close aboard, even by vessels of shallow draft.

Ballards Reef Channel is about 3.5 miles long from its lower end junction with Amherstburg Channel to its upper end junction with Fighting Island Channel. Upper Livingstone Channel joins Ballards Reef Channel about 1 mile above the latter's lower end. Below its junction with Livingstone Channel, Ballards Reef Channel is normally used for upbound traffic, and above the junction it is used for upbound and downbound traffic.

Ballards Reef Channel is well marked by lights, lighted and unlighted buoys, and by a lighted range at each end. The channel is maintained at its project depths of 27 feet below the junction with Livingstone Channel and 28 feet above the junction.

An auxilliary channel for light-draft vessels adjoins the E side of Ballards Reef Channel. It is marked by buoys and has depths of about 14 feet.

Fighting Island Channel extends from the upper end of Ballards Reef Channel, about 2 miles below the head of Grosse Ile, along the W side of Fighting Island to the natural deep water N of Fighting Island. The channel is maintained at the Federal project depth of 28 feet and is well marked by lights and buoys. **Mamajuda Island** and **Grassy Island,** each marked by a light, are close to the W side of the channel.

Anchorage.–A deep-draft anchorage, marked on the W side by buoys, is on the W side of the S end of Fighting Island Channel. The anchorage is used when conditions are unfavorable for proceeding through the confined deep channels leading S into Lake Erie. Vessels using this anchorage should be careful to avoid the long shoal extending 0.6 mile S from Mamajuda Island. A buoy marks the S end of the shoal.

A buoyed natural channel leads N from the NW part of the anchorage between the upper end of Gross Ile and **Mamajuda Island Shoal** and joins with Trenton Channel at Wyandotte, Mich. The controlling depth in the channel is about 21 feet.

Fighting Island, on the E side of Fighting Island Channel off the Ontario mainland, is about 4 miles long and about 0.5 mile wide. The entire island is either marsh or waste bed fill from various concerns that pump manufacturing residue to the island as waste. Low bluffs are on the W side of the island. A shoal, with a depth of 18 feet at its outer end marked by a lighted buoy, extends 0.5 mile N from the upper end of the island.

From about the midpoint of Ballards Reef Channel, a natural deep channel leads N between Fighting Island and the Canadian mainland. The channel is divided by **Turkey Island, Grassy Island,** and several shoals, but near the upper end, the channels rejoin before merging with the main channel of the Detroit River at the N end of Fighting Island. The channel, marked by some buoys, has a controlling depth of about 20 feet. **La Salle, Ont.,** on the E side of the channel at the N end, has several small-craft facilities.

Grosse Ile, about 8 miles long and 1.5 miles wide, is the largest island in the Detroit River. It extends along the W side of the dredged river channels from about the midpoint of upper Livingstone Channel N to about the midpoint of Fighting Island Channel opposite the city of Wyandotte, Mich. Trenton Channel separates the W side of the island from the mainland. The N end of the island, **Point Hennepin,** is a waste disposal site; the rest of the island consists mostly of residential communities and private facilities. The island has no public small-craft facilities.

Thorofare Canal, a large shallow drainage ditch about 3.5 miles long, crosses the body of Grosse Ile in a NE-SW direction. Several highway bridges and overhead cables cross this ditch. Passage should not be attempted without local knowledge.

A **slow-no wake speed** is enforced within 1,000 feet of shore of Grosse Ile, except in Trenton Channel and in the channel between the NE side of the island and Mamajuda Island Shoal. A **slow-no wake speed** is enforced in Thorofare Canal and in the canals between Grosse Ile and the small islands off its S end.

Charts 14848, 14854, 14853, 14849.–Ecorse Channel is a buoyed, natural deepwater channel that follows the curve of the Michigan shoreline from the junction of Fighting Island Channel and Trenton Channel SW for about 1.2 miles to its lower junction with Trenton Channel. Between the upper and lower junctions, Ecorse Channel is separated from Trenton Channel by **Mud Island** and the shoals that extend NE and SW from it. Ecorse Channel has a controlling depth of about 13 feet at its NE end, with deeper water in the lower part. **Ecorse, Mich.,** is on the W side of the channel at the mouth of the **Ecorse River.**

A **slow-no wake speed** is enforced within 1,000 feet of shore in the waters of the Detroit River adjacent to the city of Ecorse.

Trenton Channel extends from the N end of Fighting Island Channel SW to the Michigan shore, thence S along the shore for about 6 miles to a turning basin at the upper end of the city of Trenton, thence 3 miles to another turning basin at the lower end of the city. The dredged channel, marked by buoys, is separated from the main part of the Detroit River by Grassy Island and Grosse Ile.

In 1971–1977, the controlling depths were 26 feet at midchannel from the junction with Fighting Island Channel to a point about 0.1 mile above Bridge Road bridge, thence in 1979, 18 feet at midchannel to the turning basin N of Trenton with

18 to 28 feet in the basin, thence 18 feet at midchannel to the turning basin S of Trenton with 21 feet in the basin.

From the lower end of the Trenton Channel lower turning basin, a depth of about 6 feet can be carried through the narrow, crooked natural channels between Grosse Ile and the mainland to the town of Gibraltar and the open river below Grosse Ile.

The Bridge Road highway bridge, a swing span with a clearance of 10 feet, crosses Trenton Channel 2.2 miles below Point Hennepin. The Grosse Ile Parkway bridge, crossing Trenton Channel just above the lower turning basin, has a swing span with a clearance of 18 feet. (See **33 CFR 117.1 through 117.59 and 117.631**, chapter 2, for drawbridge regulations.)

In May 1982, a wreck covered 20 feet was reported about 1.4 miles below the Bridge Road bridge in 42°11.5'N., 83°09.0'W.

Wyandotte, Mich., fronts Trenton Channel for about 3 miles opposite Point Hennepin. The city is an important industrial center, and numerous stacks in the city are prominent from the river.

A **slow-no wake speed** is enforced within 1,000 feet of shore in the waters of the Detroit River adjacent to the city of Wyandotte.

Towage.–Tugs for Wyandotte are available from Detroit. (See Towage under Detroit.)

Wharves.–Wyandotte has several facilities fronting on Trenton Channel. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. (For information on the latest depths, contact the operators.)

City of Wyandotte, Power Plant Wharf: 0.5 mile N of Point Hennepin; 630 feet of berthing space; 23 feet alongside; deck height, 8 feet; open storage for 60,000 tons of coal; occasional receipt of coal; owned and operated by City of Wyandotte.

St. Mary's Wyandotte Cement Wharf: (42°11'16"N., 83°09'10"W.); 450-foot face, 1,190 feet of berthing space available; 23 feet alongside; deck height, 6 feet; open storage for 40,000 tons of material; covered storage for 40,000 tons of material; receipt of cement clinker; owned and operated by St. Mary's Wyandotte Cement, Inc.

Detroit Edison Co., Pennwalt Corp. Wharf: (42°11'06"N. 83°08'17"W.); 705-foot face; 16 to 18 feet alongside; deck height, 5 feet; open storage for 85,000 tons of coal; storage tanks for 500,000 gallons of liquid caustic; electrical shore-power connections; receipt of fuel oil and coal; owned by Pennwalt Corp. and operated by Detroit Edison Co.

Small-craft facilities.–Several marinas in the N part of the city provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, launching ramps, and marine supplies. Lifts to 45 tons are available for hull, engine, and radio equipment repairs.

Trenton, Mich., just S of Wyandotte, fronts Trenton Channel opposite Grosse Ile for about 4 miles. The stacks of the Detroit Edison Co., 0.5 mile SW of the Grosse Ile Parkway bridge, are prominent from the river, especially from the S.

Towage.–Tugs for Trenton are available from Detroit. (See Towage under Detroit.)

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

A **slow-no wake speed** is enforced within 1,000 feet of shore within the limits of Trenton.

Wharves.–Trenton has three deep-draft facilities. (For a complete description of the port facilities, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. (For information on the latest depths, contact the operators.)

McLouth Steel Products Corp., Ore Dock: (43°09.6'N., 83°10.'W.); 1,600-foot face; 28 feet alongside; deck height, 7 feet; open storage for over 2 million tons of iron ore, iron ore pellets, and limestone; receipt of iron ore, iron ore pellets, and limestone; owned and operated by McLouth Steel Products Corp.

Mobil Oil Corp. Wharf: (43°08.2'N., 83°10.5'W.); 200 feet of berthing space with dolphins; 21 feet alongside; deck height, 5 feet; loading platform, 9 feet; pipelines extend to storage tanks, capacity over 1¼ million barrels; occasional receipt and shipment of petroleum products; owned and operated by Mobil Oil Corp.

Detroit Edison Trenton Channel Plant Wharf: W side of Trenton Channel lower turning basin; 960-foot face; 19 to 23 feet alongside; deck height, 9 feet; open storage for 732,000 tons of coal; receipt of coal; owned and operated by Detroit Edison Co.

Small-craft facilities.–Two marinas at Trenton provide gasoline, diesel fuel, water, ice, electricity, marine supplies, and a 10-ton hoist.

Charts 14848, 14853, 14849.–Gibraltar, Mich. is a town on the Michigan mainland opposite the S end of Grosse Ile, about 2 miles below the Trenton Channel lower turning basin. Private lights and a private **239°** lighted range mark the entrance channel to Gibraltar from the Detroit River. The range should be followed closely because of rocks along the S side of the channel. A **slow-no wake speed** is enforced within 500 feet of shore within the limits of Gibraltar. Marinas inside the entrance channel provide gasoline, water, ice, electricity, sewage pump-out, and marine supplies. Hoists to 30 tons are available for hull and engine repairs.

Lake Erie Metropark Marina, about 3 miles S of Gibraltar, provides transient berths with electricity, water, and sewage pump-out. The entrance is marked by private lighted and unlighted buoys and a **270°** lighted range.

Above Fighting Island, for about 9 miles to Belle Isle, the Detroit River narrows into a single channel from 0.35 to 0.5 mile wide. In this stretch the river is generally clear, with depths of 29 to 43 feet at midriver. Buoys mark the principal shoals that extend off the banks of the river.

The most prominent feature on the Detroit River is the Renaissance Center (42°19'44"N., 83°02'24"W.). The flashing light atop the building is reported to be visible for more than 20 miles.

Anchorage.–An anchorage designated by the Canadian Government is 1 mile above the N end of Fighting Island. The anchorage, 800 feet by 4,000 feet with depths of 31 to 36 feet, is marked by a lighted buoy at the SE corner and a light at the NE corner.

A shoal, with rocks that bare, extends 400 feet off the W side of the river about 1.3 miles N of Fighting Island. Lighted buoys mark the outer edge of the shoal.

Wharves.–There are several deep-draft facilities along the W side of the river between the N end of Fighting Island and the mouth of the River Rouge, 2 miles upstream. (For a complete description of the facilities, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. (For information on the latest depths, contact the operators.)

Nicholson Terminal and Dock Co., Ecorse Pier: (42°15.6'N., 83°07.3'W.); 1,820 feet of berthing space N side, 25 to 28 feet alongside; 486-foot face, 36 feet alongside; 1,230 feet of berthing space S side, 8 to 16 feet alongside; deck height, 9 feet; 24,000 square feet covered storage; 9 acres open storage; cranes to 200 tons; receipt and shipment of general and containerized cargo, steel, coal, scrap metal, and tallow; owned and operated by Nicholson Terminal and Dock Co.

Allied Oil Co., Ecorse Terminal Dock: inner end of wharf across slip N of Nicholson Terminal and Dock Co., Ecorse Pier; 500 feet of berthing space; 24 feet alongside; deck height, 8 feet; storage tanks, capacity 835,000 barrels; receipt and shipment of petroleum products; owned by Great Lakes Steel, Division of National Intergroup Corp. and operated by Allied Oil Co.

Repairs.–Nicholson Terminal and Dock Co. operates a floating drydock at the inner end of their pier. The 2,500-ton drydock is 170 feet long with a width of 50 to 55 feet and a depth of 13 feet over the keel blocks. Portable equipment is available for making general repairs to vessels at berth anywhere in the harbor.

Charts 14848, 14853, 14854, 14849.–**River Rouge** discharges into the Detroit River at the S limit of the city of Detroit, about 3 miles above Fighting Island. Its natural course is generally about 150 feet wide in the lower river, below the junction with Short Cut Canal, and thence about 300 feet wide from the canal to the turning basin about 4 miles above the mouth. A Federal project has improved the river as far as the basin.

Short Cut Canal is a dredged cut about 0.5 mile long from the Detroit River 2 miles above Fighting Island to its junction with the natural channel of River Rouge. The canal avoids the large bend in the lower part of the natural river and shortens the distance to facilities upstream by more than 1 mile. Below their junction, Short Cut Canal and the lower part of the natural river, **Old Channel,** have created **Zug Island,** which is occupied by large industrial corporations.

In May 1985, the midchannel controlling depth was 21 feet to the West Jefferson Avenue bridge, thence 18 feet at midchannel to the Fort Street bridge, thence 20 feet at midchannel to the turning basin at the head of the project with 16 to 21 feet in the basin except for lesser depths along the N and W sides. In 1981, the controlling depths were 16 feet (25 feet at midchannel) through the natural mouth of the River Rouge to the overhead pipeline, thence 16 feet at midchannel upstream to the junction with Short Cut Canal. The N side of the entrance to Short Cut Canal is marked by a lighted buoy. Rapid shoaling occurs in the canal and river because of the soft bottom. A number of cables, water mains, and tunnels cross under the canal and river; masters should exercise caution when dropping anchors.

Regulations.–A **speed limit** of 4 mph is enforced in River Rouge and Short Cut Canal. (See **33 CFR 162.130 through 162.140,** chapter 2, for navigation regulations.)

Wharves.–Both sides of River Rouge and Short Cut Canal are lined by industrial corporations and their deep-draft facilities. (For a complete description of facilities in the River Rouge, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. (For information on the latest depths, contact the operator.) Many of the facilities have railway, water, and electrical shore-power connections.

Facilities along the S side of Short Cut Canal and River Rouge:

Detroit Edison, River Rouge Plant Wharf: S side of Short Cut Canal entrance; 1,080 feet of berthing space with dolphins; 23 feet alongside; deck height, 9 feet; open storage for over 1 million tons of coal; pipeline to storage tanks, capacity 238,000 barrels; receipt of coal and fuel oil; owned and operated by Detroit Edison Co.

Enterprise Oil and Gas Co., River Rouge Terminal Dock: at the junction of Short Cut Canal and Old Channel; 460-foot face; 22 feet alongside; deck height, 7 feet; pipelines extend to tank storage, capacity 739,000 barrels; receipt and shipment of petroleum products; owned by Texaco, Inc. and operated by Enterprise Oil and Gas CO.

Standard Oil, River Rouge Dock: about 0.2 mile above Enterprise Oil and Gas CO., River Rouge Terminal Dock; 1,000-foot face; 16 feet alongside; deck height, 7½ feet; pipelines extend to tank storage, capacity over 1½ million barrels; receipt and

Structures across River Rouge

**Miles above the mouth of the river*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	Short Cut Canal and River							
1	Overhead cable	Power	0.32				191	
2	Overhead cable	Power	0.37				191	
3	Overhead pipeline	Gas	0.39				153	
4	National Steel Corp. bridge	Railroad	0.40			125	6	Bascule. KUZ-371. Notes 1 and 2.
5	Overhead pipeline	Gas	0.41			240	123	
6	Overhead cable		0.45				174	
	Junction of Short Cut Canal and Old Channel		0.53					
7	West Jefferson Ave. bridge	Highway	1.10			125	9	Bascule. Note 1.
8	ConRail bridge	Railroad	1.48			123	8	Bascule. Notes 1 and 2.
9	Fisher Freeway I-75 bridge	Highway	1.85			230	100	Fixed.
10	Norfolk & Western Ry. bridge	Railroad	1.87			125	8	Bascule. Note 1.
11	Overhead pipeline		1.90			300	103	
12	Fort St. bridge	Highway	2.20			118	9	Bascule. Note 1.
13	Dix Ave. bridge	Highway	2.73			125	8	Bascule. Note 1.
14	Overhead cables	Power	2.75				130	
	Old Channel via the mouth							
15	Overhead pipeline	Gas	0.26				153	
16	Delray Connecting RR bridge	Railroad	0.30			120	7	Bascule. Note 1.
17	Delray Connecting RR bridge	Railroad	0.34			120	7	Bascule. Note 1.
18	Overhead cable		0.77				188	
19	Delray Connecting RR bridge	Railroad	0.80	102			7	Swing. Turntable on right side. Note 1.
20	Overhead cable		0.82				188	
	Junction of Old Channel and Short Cut Canal		1.55					

Note 1.–See 33 CFR 117.1 through 117.59 and 117.645, chapter 2, for drawbridge regulations.)

Note 2.–The bridgetender monitors VHF-FM channel 16 (156.80 MHz) and works on channel 12 (156.60 MHz).

shipment of petroleum products; owned and operated by Standard Oil, Division of Amoco Oil Co.

Marblehead Lime Co., River Rouge Wharf: 800 feet below West Jefferson Avenue bridge; 1,280 feet of berthing space; 25 feet alongside; deck height, 4 feet; open storage for 350,000 tons of limestone; storage silos for 2,200 tons of lime; owned and operated by Marblehead Lime Co., Division of General Dynamics Corp.

United States Gypsum Co. Dock: 800 feet above West Jefferson Avenue bridge; 405-foot face plus 500 feet along natural bank; 21 feet alongside dock; deck height, 6 feet; open storage for 85,000 tons of gypsum; storage silos, capacity 90,000 tons; receipt of gypsum; owned and operated by United States Gypsum Co.

Detroit Bulk Dock: 400 feet below ConRail bridge; 509-foot face; 20 feet alongside; deck height, 4 feet; 11 acres of open storage; loading tower, rate 750 tons per hour; receipt of limestone, salt, coal, fluorspar, and coke, shipment of coke, concrete, sand, and limestone; owned by Dale Osborne and operated by Detroit Bulk Dock, Inc.

Inland Lime and Stone Co., Rouge River Dock: 700

feet above ConRail bridge; 654 feet of berthing space along natural bank; 18 to 20 feet alongside; bank height, 2 to 6 feet; open storage for 50,000 tons of limestone and 52,000 tons of salt; receipt of limestone and bulk salt; owned and operated by Inland Lime and Stone Co., Division of Inland Steel Co.

Trumbull Asphalt Co., Detroit Plant Wharf: 700 feet above Fisher Freeway bridge; 285 feet of berthing space with dolphins; 20 feet alongside; deck height, 6 feet; tank storage with capacity of 131,000 barrels; receipt of asphalt; owned and opperated by Trumbull Asphalt Co.

Marathon Petroleum Co., River Rouge Terminal Pier: 500 feet below Fort Street bridge; offshore wharf, 415-foot face; 26 feet alongside; deck height, 5 feet; pipelines extend to storage tanks, capacity 900,000 barrels; shipment of asphalt; owned and operated by Marathon Petroleum Co.

Marathon Petroleum Co., Fordson Island Terminal Wharf: NE side of Fordson Island 1,200 feet below Dix Avenue bridge; offshore wharf, 350-foot face; 27 feet alongside; deck height, 5 feet; pipelines extend to storage tanks, capacity over 1¾ million barrels; shipment of petroleum products; owned and operated by Marathon Petroleum Co.

Detroit Lime Co. Wharf: 200 feet below Dix Avenue bridge; 300-foot face; 21 feet alongside; deck height, 9 feet; open storage for 350,000 tons of limestone; storage silos for 8,400 tons of lime; receipt of limestone and coal; owned and operated by Detroit Lime Co., subsidiary of Edward Levy Co.

Facilities on the N side of River Rouge above Short Cut Canal:

Detroit Marine Terminals, River Rouge Dock: 500 feet below West Jefferson Avenue bridge; 1,300-foot wharf, 27 feet alongside; 1,000 feet of natural bank, 21 feet alongside; deck height, 5 feet; 23,000 square feet covered storage; 45 acres open storage; cranes to 250 tons; receipt and shipment of general and containerized cargo, receipt of fluorspar and ferromanganese, shipment of scrap metal and coke; owned and operated by Detroit Marine Terminals Inc.

Concrete Mix Supply Co. Wharf: immediately above West Jefferson Avenue bridge; 735-foot face along natural bank; 15 feet alongside; deck height, 6 feet; open storage for 90,000 tons of limestone; receipt of limestone; owned by P. A. Wolfe and operated by Concrete Mix Supply Co.

Marblehead Lime Co. Wharf: 1,400 feet above West Jefferson Avenue bridge; 900 feet of berthing space; 21 feet alongside; deck height, 8 feet; open storage for 110,000 tons of material; receipt of limestone and coal; owned and operated by Marblehead Lime Co.

Peerless Cement Co., Detroit Plant Wharf: 900 feet below Fisher Freeway bridge; 600-foot face and 250 feet along natural bank; 21 feet alongside; deck height, 13 feet; 154,000 square feet covered storage for clinker; open storage for 69,000 tons of coal; storage silos for 69,000 tons of cement; receipt of limestone, gypsum, and coal; owned and operated by Peerless Cement Co.

Industrial Fuels Corp. Wharf: 600 feet above Fisher Freeway bridge; 792-foot face; 18 to 19 feet alongside; deck height, 4 feet; open storage for 125,000 tons of coal; receipt of coal; owned by Industrial Fuels Corp. and operated by Koenig Fuel and Supply Co. and Industrial Fuels Corp.

Morton Salt CO., Detroit Wharf: 1,100 feet above Fisher Freeway bridge; 500 feet of berthing space along natural bank; 15 feet alongside; deck height, 7 feet; silo storage for 8,000 tons of salt; open storage for 38,000 tons of salt; receipt of bulk salt; owned and operated by Morton Salt Co.

Rouge Steel Co., Coal Tar Dock: N side of the turning basin; 1,300-foot face; 27 feet alongside; deck height, 6 feet; pipeline extends to tank storage, capacity over 2½ million gallons; shipment of coal tar; owned and operated by Rouge Steel Co.

Rouge Steel Co., East Dock: E side of the slip on the NW side of the turning basin; 2,614-foot face; 25 feet alongside; deck height, 6 feet; storage trough for 152,000 tons of material; open storage for 437,000 tons of coal, 308,000 tons of limestone, and 800,000 tons of iron ore and pellets; three bucket unloaders, combined unloading rate 3,500 tons per hour; receipt of iron ore, iron ore pellets, coal, and limestone; shipment of mill scale; owned and operated by Rouge Steel Co.

Rouge Steel Co., West Dock: W side of the slip on the NW side of the turning basin; 2,915-foot face; 25 feet alongside; deck height, 6 feet; open storage for 11,000 tons of limestone; receipt of limestone; owned and operated by Rouge Steel Co.

Facilities on the mainland side of Old Channel:

Allied Chemical Co. Tar Plant, Coal Tar Dock: 1,800 feet above mouth of river; 275 feet of berthing space with shore moorings; 22 feet alongside; deck height, 5 feet; pipeline to storage tanks, capacity over 3¼ million gallons; receipt and shipment of coal tar, shipment of creosote; owned and operated by Allied Chemical Co.

Allied Chemical Co. Tar Plant, Pitch Dock: 2,400 feet above mouth of river; 250 feet of berthing space with dolphins; 22 feet alongside; deck height, 8 feet; open storage for 18,000 tons of bulk pitch; shipment of bulk pitch; owned and operated by Allied Chemical Co.

Facilities on Zug Island:

All the facilities on Zug Island are owned and operated by Great Lakes Steel, Division of National Intergroup, Inc.

Great Lakes Steel, Ore Dock No. 1: N side of the island at the mouth of Old Channel; 1,287-foot face; 21 feet alongside; deck height, 8 feet; open storage for 860,000 tons of iron ore and pellets; receipt of iron ore, iron ore pellets, and limestone.

Great Lakes Steel, Dock A: N side of the island 0.6 mile above the mouth of Old Channel; 1,000 feet of berthing space along natural bank; 17 feet alongside; bank height, 8 feet; open storage for 160,000 tons of coal; receipt of coal.

Great Lakes Steel, Dock B: NW side of the island

0.6 mile below junction with Short Cut Canal; 1,000 feet of berthing space along natural bank; 17 feet alongside; bank height, 8 feet; open storage for 260,000 tons of coal; receipt of coal.

Great Lakes Steel, Short Cut Canal Dock: S side of the island at the mouth of Short Cut Canal; 1,300 feet of berthing space along natural bank; 21 feet alongside; bank height, 8 feet; open storage for 90,000 tons of coal; receipt of coal.

Great Lakes Steel, Stone Dock: E side of the island on the Detroit River 1,000 feet N of the mouth of Short Cut Canal; 510-foot face; 27 feet alongside; deck height, 8 feet; open storage for 220,000 tons of limestone; receipt of limestone and iron ore pellets.

Great Lakes Steel, Ore Dock No. 3: E side of the island immediately N of the Stone Dock; 1,349-foot face; 27 feet alongside; deck height, 10 feet; open storage for 898,000 tons of iron ore and over 1 million tons of iron ore pellets; receipt of iron ore, iron ore pellets, and coal.

Great Lakes Steel, Coal Wharf No. 1: E side of the island immediately N of Ore Dock No. 3; 2,100-foot face; 25 to 27 feet alongside; deck height, 10 feet; open storage for 450,000 tons of coal; receipt of coal.

Supplies.–Bunker fuel is available at several facilities in the river, or by barge or truck. A supply company on the W side of Old Channel has supplies and provisions.

Charts 14848, 14853, 14849.–About 0.5 mile above the mouth of Old Channel, overhead power cables with a minimum clearance of 183 feet across the Detroit River between Detroit and Windsor, Ont.

The **Ambassador Bridge** crosses the Detroit River 2.2 miles above the mouth of Old Channel. The suspension span has a clearance of 156 feet for 100 feet at the center, decreasing to 133 feet at each side of the river.

A shoal, marked at its outer edge by a lighted buoy, extends off the Canadian side of the river for about 0.5 mile above the Ambassador Bridge.

Two tunnels cross under the Detroit River above the Ambassador Bridge. The ConRail Tunnel, 0.9 mile above the bridge, was covered by a depth of 31 feet at midchannel in 1959, with depths of 24 and 34 feet, 300 feet from the United States shoreline and 350 feet from the Canadian shoreline, respectively. The Detroit-Windsor Tunnel, a highway tunnel 2 miles above the bridge, was covered by a depth of 40 feet at midchannel in 1959, with depths of 24 and 36 feet, 500 feet from the United States shoreline and 350 feet from the Canadian shoreline, respectively. Vessels are cautioned not to anchor over or near these tunnels.

A shoal with a least depth of 15 feet extends off the U.S. shoreline between the two tunnels. Buoys mark the upper and lower ends of the shoal.

Belle Isle, about 3 miles long and 1 mile wide, is in midriver near the upper end of the Detroit River. **Fleming Channel,** the main river channel, follows between the S side of the island and the Canadian shore to the head of the river at Lake St. Clair. The lower part of the channel is through natural deep water, thence from about midlength of Belle Isle to Lake St. Clair the channel is dredged. The limits of the dredged channel are marked by lighted buoys. **Belle Isle Light** (42°20.6'N., 82°57.6'W.), 83 feet above the water, is shown from a red pile on the SE point of the island and marks the N side of Fleming Channel. In 1974-November 1981, the controlling depth was 27 feet for a least width of 800 feet, except for shoaling to 20 feet on the NW channel edge NE of Belle Isle Light and the SE channel edge NW of Peche Island Light.

William Livingstone Memorial Light (42°20.8'N., 82°57.2'W.), 58 feet above the water, shown from a white pyramidal monument on the E end of Belle Isle, is a 247° leading light marking the entrance to the Detroit River from Lake St. Clair.

Generally, only local and pleasure craft use the channel on the N side of Belle Isle. The lower entrance is marked by a lighted buoy which marks a 6-foot shoal that extends 0.5 mile from the W end of Belle Isle. **Scott Middle Ground** is an extensive shoal area, with depths to 1 foot, between Belle Isle and the U.S. shore. Natural channels marked by buoys lead N and S of the shoal. The N channel has a controlling depth of about 18 feet. Above Scott Middle Ground, a 12-foot spot is marked on its N side by a buoy in midchannel N of Belle Isle. The upper entrance to the channel N of Belle Isle is through a dredged channel marked by buoys. In 1980, the controlling depth was 18 feet. A fixed highway bridge (Douglas McArthur Bridge) with a clearance of 32 feet crosses from Detroit to the lower end of Belle Isle.

Detroit Memorial Park, on the mainland side of the channel N of Belle Isle, has a marina that provides transient berths, electricity, water, and sewage pump-out. The entrance is marked by private lights.

Peche (Peach) Island is off the Canadian shore on the S side of the head of the Detroit River. Extensive shoals are off the W, N, and E sides of the island. **Peche Island Light** (42°20.9'N., 82°56.6'W.), 32 feet above the water, is shown from a red skeleton tower with a small house on a concrete base with a triangular red daymark on the NW side of the shoal off the W end of the island. The light marks the SE side of Fleming Channel, but should not be passed close aboard because of protective riprap. A lighted buoy at the W extremity of the shoal marks the N side of the entrance to a buoyed natural deepwater channel that leads from Fleming Channel around the S side of Peche Island into Lake St. Clair. The depths in Lake St. Clair at the outer end of the channel are about 8 feet.

Windmill Point Light (42°21.5'N., 82°55.8'W.), 42 feet above the water, is shown from a white conical tower on a concrete base on the N side of the entrance to the Detroit River.

Windsor, Ont., is a major industrial city fronting the SE side of the Detroit River from Fighting Island NE to the head of the river. The major commodities handled are automobiles and automotive components, drugs, chemicals, brewed and distilled products, and agricultural products.

Prominent features.–Prominent at Windsor are the white tank with the name "Ford" 0.7 mile SSE of the foot of Belle Isle, the Hiram Walker and Sons Ltd. grain elevator with the lighted "Canadian Club" sign SSW of the foot of Belle Isle, the TV mast 2.5 miles WSW of Belle Isle, and the stacks opposite the mouth of Old Channel of River Rouge. At the E end of town, the old Pelee Passage lighthouse (42°20.4'N., 82°55.9'W.), which has been restored by private interests, is also prominent.

Caution.–When a vessel is unloading at the Hiram Walker and Sons Ltd. wharf opposite the foot of Belle Isle, passing vessels should reduce speed to prevent wake damage to the grain elevator unloading equipment.

Windsor is a **Canadian customs port of entry.**

Harbor regulations.–The Windsor Harbour Commission administers the harbor and a **harbormaster** enforces the regulations. The following **speed limits** are enforced in the harbor: 10 mph for vessels 65 feet or more long; 10 mph for vessels less than 65 feet long between Belle Isle West End Lighted Buoy at the lower end of Belle Isle and Peach Island Lighted Buoy 4 at the lower end of Peach Island; 6 mph between Peach Island Lighted Buoy 4 and Peach Island Lighted Buoy off the SE end of Peach Island. Between Belle Isle West End Lighted Buoy and Peach Island Lighted Buoy 4, no vessel shall overtake another vessel of 65 feet or more long. Copies of the regulations are available from the Windsor Harbour Commission, 500 Riverside Drive West, Windsor, Ontario N9A 5K6.

Wharves.–Windsor has numerous deep-draft facilities fronting on the Detroit River. The depths alongside for the facilities described are reported depths. Most of the facilities described have highway and rail connections.

Canadian Rock Salt Co. Ltd. Wharf: (42°15'27"N., 83°06'31"W.); 685-foot face; 26 feet alongside; 3 acres open storage.

United Co-operatives of Ontario, Windsor Grain Terminal: (42°15'51"N., 83°06'18"W.), 1,278 feet of berthing space; 33 feet alongside; grain elevator with 83,000 ton capacity; various grains.

Morton Terminal Ltd. Wharf: (42°16'09"N., 83°05'52"W.); 2,000-foot face; 25 feet alongside; 32,000 square feet covered storage; 180 acres open storage; 245-ton crawler crane.

J. Clark Keith-Hydro Electric Power Corp. Wharf: (42°16'48"N., 83°05'49"W.); 606-foot face; 18½ feet alongside; open storage for 1 million tons of coal; receipt of coal.

Windsor Bulk Storage West End Dock: 1,600 feet above J. Clark Keith-Hydro Electric Power Corp. Wharf; 660-foot face; 30 feet alongside; open storage for 75,000 tons of sand and stone.

Canadian Salt Co. Ltd. Wharf: 1,350 feet above Windsor Bulk Storage West End Dock; 185-foot face; 22 feet alongside; pipelines to tank storage.

Kennette Contracting Co. Ltd. Wharf: 500 feet above Canadian Salt Co. Ltd. Wharf; 450-foot face; 26 feet alongside; 21 acres open storage; bulk storage.

Newman Harbour Terminals and Transportation Inc.: 500 feet above Kennette Contracting Co. Ltd. Wharf; 150-foot face; 24 feet alongside; 120,000 square feet covered storage; 20,000 square feet open storage; receipt and shipment of general cargo.

Sterling Fuels Wharf: (42°17'42"N., 83°05'17"W.), 1,000-foot face; 29 feet alongside; vessel bunkering.

Windsor Harbour Commission, Confederation Dock: (42°17'50"N., 83°05'06"W.), 1,100-foot face; 25 feet alongside; 12 acres open storage; sand, stone, and bulk materials.

Windsor Harbour Commission, Dominion Dock: 600-foot face, 25 feet alongside; 25 acres open storage; sand, stone, and bulk materials.

Adams Cartage Dock: (42°18'00"N., 83°04'51"W.); 850-foot face; 25 feet alongside; 22,000 square feet covered storage; open storage for 100,000 tons of steel.

Pyramid Aggregates Dock: 1,100 feet above Adams Cartage Dock; 450-foot face; 20 feet alongside; 6,000 square feet covered storage; 150,000 square feet open storage.

Premier Concrete Products and Lake Ontario Cement Co. Wharf: 1,000 feet above Pyramid Aggregates Dock; 1,000-foot face; 21 feet alongside; 9 acres open storage; building aggregates and bulk cement.

Canadian Pacific Railway Wharf: (42°19'01"N., 83°03'11"W.); 150-foot face; 26 feet alongside; railroad ferry terminal.

Dieppe Park Dock: 0.5 mile above Canadian Pacific Railway Wharf; 800-foot face; 26 feet alongside; docking visiting non-commercial vessels.

Canadian National Railways Wharf: (42°19'18"N., 83°02'09"W.); 36 feet alongside; railroad ferry terminal.

Hiram Walker and Sons Ltd. Wharf: (42°19'36"N., 83°00'41"W.); 833-foot face; 24 feet alongside; grain silos for 1¼ million bushels.

Ford Motor Co. of Canada Ltd. Wharf: 1,800 feet above Hiram Walker and Sons Ltd. Wharf; 1,800-foot face; 24 feet alongside; 360,000 square feet open storage; receipt of fuel oil, pig iron, and sand.

Supplies.–Bunker coal is available at Consolidation Coal Co. Wharf, and bunker C and diesel fuel are available by truck or barrel from several companies. Water and all types of marine supplies and provisions are available in Windsor.

Repairs.–There are no drydocking facilities, but minor and major machinery, radio, and radar repairs can be made by several firms.

Communications.–Windsor has good rail and highway connections with major United States and Canadian cities. Windsor Airport links the city with other points in Canada.

Detroit, Mich., fronts the NW side of the Detroit River from the mouth of Old Channel of River Rouge NE to the head of the river. It is a major industrial city and the center of the U.S. automobile industry. The chief waterborne commerce is in coal, petroleum products, limestone, steel, iron ore and pellets, and general and containerized cargo.

Anchorage.–Anchorage in the Detroit River is restricted by Federal regulation. (See **33 CFR 162.135**, chapter 2, for regulations.) If weather conditions preclude passage through the river, vessels generally hold up or anchor in Lake Erie if northbound or in Lake Huron if southbound. Under stress of weather vessels occasionally anchor on the NW side of the river from 0.6 to 1.5 miles below Belle Isle.

Weather.–(See page T-7 for **Detroit climatological table.**)

Towage.–Tugs to 2,200 and 2,000 hp are available for Detroit from Gaelic Tugboat Co. or Great Lakes Towing Co., respectively. Tugs of the former company moor in the River Rouge; from the latter moor about 1.3 miles S of the River Rouge, on W bank Detroit River.

Arrangements for the Great Lakes Towing Co. tugs are made through the dispatcher in Cleveland at 800-321-3663 or on VHF-FM via remote antenna. The Gaelic Tugboat Co. dispatcher in Detroit is reached at 313-841-7903 (800-1700), 313-543-4322 (1700-0800) or on VHF-FM radio.

Detroit is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard.–A Marine Safety Office and a Coast Guard base are at Detroit. (See appendix for address.) Belle Isle Coast Guard Station is on the SE side of Belle Isle.

Wharves.–Detroit has numerous deep-draft facilities along the Detroit River. (For a complete description of the port facilities, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given are reported depths. (For information on the latest depths, contact the operators.) Most of the facilities described have rail and highway connections, and some have water and electrical shore-power connections.

Detroit Coke Corp., Detroit River Dock: W side of the Detroit River immediately above the mouth of Old Channel; 640-foot face, 1,130 feet with dolphins; 22 feet alongside; deck height, 6 feet; open storage for 220,000 tons of coal; receipt of coal; owned and operated by Detroit Coke Corp.

Detroit Edison Co. Delray Plant Wharf: 2,000 feet above the mouth of Old Channel; 450-foot face; 24 feet alongside; deck height, 7½ feet; pipeline to storage tanks, capacity 250,000 barrels; receipt of fuel oil; owned and operated by Detroit Edison Co.

City of Detroit, Mistersky Power Station Wharf: 0.8 mile above Detroit Edison Co. Delray Plant Wharf; 1,049-foot face; 28 feet alongside; deck height, 6 feet; pipelines extend to tank storage, capacity 450,000 barrels; receipt of fuel oil; owned by city of Detroit and operated by Public Lighting Department.

Nicholson Terminal and Dock Co., Summit Street Dock: W side of the river 0.9 mile below Ambassador Bridge; 480-foot face; 28 feet alongside; deck height, 6 feet; 100,000 square feet covered storage; 16 acres open storage; cranes to 200 tons; receipt and shipment of general and containerized cargo, and steel, and bulk liquids; owned by city of Detroit and operated by Nicholson Terminal and Dock Co.

Detroit Marine Terminals, Clark Avenue Wharf: 0.6 mile below Ambassador Bridge; 2,130 feet of berthing space; 27 feet alongside; deck height, 6 feet; 25,000 square feet covered storage; 25 acres open storage; cranes to 200 tons; receipt and shipment of general and containerized cargo and steel; shipment of tallow; owned and operated by Detroit Marine Terminals, Inc.

Huron Cement Wharf: (42°19′50″N., 83°01′45″W.); 589-foot face; 21 feet alongside; deck height, 5 feet; open storage for 30,000 tons of stone and 15,000 tons of sand; pipelines extend to storage silos for 28,000 tons of cement; receipt of limestone and bulk cement; owned by Huron Cement, division of National Gypsum Co., and operated by Huron Cement, division of National Gypsum Co., and Koening Fuel and Supply Co.

Medusa Cement Detroit Dock: (42°19′59″N., 83°01′24″W.); 225-foot face; 28 feet alongside; deck height, 6 feet; vessels discharge into receiving hopper with conveyor to storage silos, capacity 2,900 tons, system operates at 1,500 tons per hour; receipt of bulk cement; owned and operated by Medusa Cement Co., division of Medusa Corp.

Detroit Edison, Conners Creek Coal Wharf: (42°21′17″N., 82°57′18″W.); 420-foot face; 16 to 21 feet alongside; deck height, 5 feet; open storage for 250,000 tons of coal; pipeline extends to storage tank, capacity 125,000 barrels; receipt of fuel oil and coal; owned and operated by Detroit Edison Co.

Supplies.–Marine supplies and provisions of all types are available at Detroit. Water is available at many of the wharves. Number 1, 2, and 6 fuel oils are available, mostly by barge, but by truck at some locations and by pipeline at the Shell Oil Co. and Texaco docks in River Rouge.

Foreign-Trade Zone No. 70 and Subzones Nos. 70A and 70B are in Detroit. (See chapter 1, Foreign-Trade Zones, and appendix for addresses.)

Repairs.–Detroit has no facilities for drydocking deep-draft vessels, but medium-draft vessels may drydock at the Nicholson Terminal and Dock Co. Pier, 1.4 miles below the mouth of Short Cut Canal. Detroit Boat Basin, Inc., opposite the N side of Belle Isle, performs repairs to pleasure and occasionally small commercial craft. A 200-ton marine railway with 7 feet over the keel blocks, a 20-ton marine elevator, and machine, carpenter, welding, and paint shops are available. The largest vessel handled by the marine railway is 135 feet.

Small-craft facilities.–Detroit has several small-craft facilities, most of which are opposite the head of Belle Isle. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, and marine supplies are available. Hoists to 50 tons and marine railways to 200 tons are available for hull, engine, and electronic repairs.

Ferries.–Several ferries operate from landings between the Ambassador Bridge and Belle Isle. Two companies carry railroad cars back and forth across the river to Windsor, Ont. A passenger excursion ferry operates from Detroit to the amusement park on Bois Blanc Island in the lower part of the river.

The U.S. Postal Service operates a Marine Post Office at Detroit. A special mail boat delivers and receives mail from vessels passing through the river, usually meeting them at the Ambassador Bridge. Arrangements can be made with 1 hour advance notice by contacting agent "Westcott" on VHF-FM channels 10 (156.50 MHz) or 16 (156.80 MHz).

Communications.–Detroit has excellent rail and highway connections. The city has several airports.

8. LAKE ST. CLAIR

Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake St. Clair is an elevation of 571.7 feet above mean water level at Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955). (See Chart Datum, chapter 1.)

Dimensions, etc.

Length, steamer track, outlet of South Channel of St. Clair River to Windmill Point Lighthouse; 18.5 miles.

Length (right line), on about longitude 82°45'W.; 26 miles.

Breadth (right line), on about latitude 42°25'N.; 24 miles.

Water surface of lake (including Detroit River and St. Clair River); 198 square miles (U.S.), 292 square miles (Canada).

Entire drainage basin (including Detroit River and St. Clair River); 3,050 square miles (U.S.), 4,370 square miles (Canada).

General description.–Lake St. Clair is an expansive shallow basin, with low, marshy shores and a flatly sloping bottom. The lake has a greatest natural depth of 21 feet. St. Clair River flows from N and enters the N part of the lake through several channels of a wide delta area. The outflow of the lake is at the SW end through the Detroit River. The chief importance of the lake is the dredged deep-draft channel that leads across it to connect Detroit River and St. Clair River. No large commercial facilities or harbors are on the lake.

Fluctuations of water level.–The normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and fall, the lowest stages prevailing during the winter and the highest during the summer.

In addition to the normal seasonal fluctuations, oscillations of irregular amount and duration are also produced by storms. Sudden changes in wind or barometric pressure can cause fluctuations of 1 foot or more that may last several hours. At other times, strong winds of sustained speed and direction drive forward a greater volume of surface water than can be carried off by the lower return currents, thus raising the water level on the lee shore and lowering it on the windward shore. This effect is more pronounced in bays, where the impelled water is concentrated in a small space by converging shores, especially if coupled with a gradually sloping inshore bottom which even further reduces the flow of the lower return currents. This effect is very pronounced in Anchor Bay.

Weather.–Strong winds associated with squall lines or winter storms occasionally whip across Lake St. Clair causing a danger to shipping. One July, a line of thunderstorms generated a 61-knot, 1-minute windspeed recorded by a ship traversing the lake. Peak gusts at Selfridge Air National Guard Base have been clocked in the 60-knot range in spring and late fall, and in the 40- to 50-knot range at other times during the navigation season. Winds over the lake frequently blow out of the S through W, but numerous local effects come into play on this shallow body of water. At Selfridge, northerlies and northwesterlies are also frequent, particularly during the morning hours, while southeasterlies are common during spring and summer afternoons.

While haze, smoke, and pollution often drop visibilities below 7 miles, on 9 to 13 days per month, they seldom fall to less than 0.5 mile. Fog, the principal cause of very poor visibilities, is most likely in autumn and early spring. Visibilities of less than 0.5 mile occur on about 2 to 3 days per month during these periods.

Ice.–Ice forms early on this body of water, usually starting in the shallows of Anchor Bay, along the St. Clair shores, and in the E at Mitchell Bay. Because of prevailing winds and currents, the W side of the lake is the last to become covered and the first to clear. Navigation is usually extremely limited by early December. The broken track through the lake closes quickly, but little rafting or ridging occurs. The head of the Detroit River is relatively ice-free for the entire winter, except for minor ice jams. Heaviest ice cover usually occurs in late February or early March. Thawing is rapid and is aided by the winds and currents, which move drifting floes to the head of the Detroit River, where strong river currents move them downstream. The lake is usually open by early April.

Navigation regulations.–A vessel traffic reporting system and related navigation regulations have been established for the connecting waters from Lake Erie to Lake Huron. (See **33 CFR 162.130 through 162.140**, chapter 2, for regulations.)

Vessel Traffic Service.–The Canadian Coast Guard operates a Vessel Traffic Service in Canadian waters from Long Point in Lake Erie through the Detroit and St. Clair Rivers to De Tour Reef Light in Lake Huron. (See Chapter 3 and the Annual Edition of Canadian Notices to Mariners for complete information.)

Pilotage.–The waters of Lake St. Clair are Great Lakes designated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. Registered pilots for Lake St. Clair are supplied by Lakes Pilots Association. (See appendix for address.) Pilot exchange points are just below the Ambassador Bridge in Detroit River and off Port Huron at the head of St. Clair River in about 43°05'30"N., 82°24'42"W. The pilot boat in the Detroit River, J.W. WESTCOTT II, has a black hull encircled by an orange band and a white cabin with the words "U.S. Mail" in black letters. Three pilot boats are at Port Huron; HURON BELLE has an international orange hull with an aluminum cabin, and HURON MAID and HURON LADY each have an international orange hull with a white cabin. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

Charts 14850, 14853, 14851.–The main vessel route across Lake St. Clair is through the dredged channel that leads from the head of the Detroit River NE for about 16 miles to St. Clair Cutoff Channel at the mouth of the St. Clair River. The channel is well marked throughout its length by lights and lighted and unlighted buoys, and at its lower end by a **227°45'** lighted range NE of Peche Island. A radar transponder beacon (Racon) is at the front range light. (See Racons, chapter 1, for additional information.) The front range light is protected by riprap and should not be passed close aboard, even by vessels of shallow draft. **Lake St. Clair Light** (42°27.9'N., 82°45.3'W.), 52 feet above the water, is shown from a white square tower on a cylindrical base on the NW side of the channel at the slight turn near its midpoint. A radar beacon (Racon) is at the light. (See Racons, chapter 1, for additional information.)

In 1983, the controlling depth was 22 feet (26 feet at midchannel) in the Lake St. Clair ship channel.

A **dumping ground**, well marked by buoys, is on the SE side of the dredged channel near its lower end. Although new dumping above a depth of 8 feet is prohibited, there are shoals considerably above that depth, and the dumping ground is considered unsafe for navigation.

The W, or Michigan shore of Lake St. Clair, has been extensively developed with homes, yacht clubs, and marinas. The communities of **Grosse Pointe Park, Grosse Pointe, Grosse Pointe Farms, Grosse Point Shores,** and St. Clair Shores, suburban to Detroit, are on the W lakeshore extending from Windmill Point at the head of Detroit River N for about 10 miles. Several piers, some marked by private lights, extend as much as 0.5 mile into the lake with depths of 6 to 10 feet alongside.

Milk River is a small river flowing into Lake St. Clair on the NW side of **Gaukler Point**, 7.5 miles N of Windmill Point. A sunken wreck is about 0.8 mile 125° from Gaukler Point. A fixed highway bridge with a clearance of 8 feet crosses the river just above the mouth. About 0.2 mile above the bridge, just below another bridge, is a series of taintor gates that control the water level upstream. The river below the gates has been developed for small-craft berthing.

A boulder ledge with depths of 2 feet extends 1.5 miles NNE from Gaukler Point. Buoys mark the E and W sides of the ledge, and a lighted buoy marks the N end.

St. Clair Shores, Mich., extends along the lakeshore from the Milk River N for 6.5 miles. **Miller Memorial Light** (42°27.8'N., 82°52.8'W.), 260 feet above the water, is a prominent private aid shown from atop a high-rise apartment building, 0.3 mile N of the Milk River mouth.

St. Clair Shores Coast Guard Station is 0.7 mile N of the light. A **slow-no wake speed** is enforced in the canals of St. Clair Shores and the adjacent waters of Lake St. Clair. The lakefront for about 1 mile N of Milk River has numerous large small-craft facilities. All types of marine services and supplies, including lifts to 40 tons, are available. The rest of the St. Clair Shores lakefront has private facilities with a few public parks and ramps.

Cutoff Canal empties into the lake 7.5 miles N of Gaukler Point. The canal extends about 2 miles NW to a weir just below the junction with the Clinton River at Mount Clemens. During flood conditions, the canal diverts a major part of the flow of Clinton River. The canal has depths of 9 feet just inside the mouth, thence 6 feet to just below the weir, thence 2 feet and 1 foot below and above the weir, respectively.

Point Huron (42°33.8'N., 82°47.1'W.) is the SE point of a projection of land that extends into Lake St. Clair NE of Cutoff Canal. **Black Creek,** on the N side of Point Huron, leads to an extensive area of privately dredged small-craft channels. The entrance to the creek is marked by private buoys and a private **297°15'** lighted range. In 1977, the reported controlling depth was 5 feet through the entrance. A **slow-no wake speed** is enforced in the creek and connecting canals. Marinas at **Metropolitan Beach** on the W side of the waterway provide transient berths, water, ice, electricity, and sewage pump-out.

Anchor Bay, fed by North Channel of the St. Clair River, is the shallow N arm of Lake St. Clair N of Point Huron. A depth of about 8 feet can be carried across the bank that separates the S end of the bay from the main body of the lake. The best water across the bank is on a general N-S line just E of Point Huron Lighted Buoy 1 (42°33.2'N., 82°44.9'W.). The central part of the bay has depths of about 10 feet with gradual shoaling toward the shores.

Clinton River is a narrow crooked stream discharging into the W side of Anchor Bay about 2 miles N of Point Huron. The city of **Mount Clemens, Mich.,** is about 7.3 miles above the mouth.

Channels.–A dredged channel leads from Anchor Bay between two breakwaters through the mouth of the river and upstream to Mount Clemens. The S breakwater encloses a harbor basin on the S side of the channel at the mouth of the river. The entrance is marked by lighted and unlighted buoys, lights on the outer ends of the breakwaters, and a light on the N side of the river mouth. In 1984, the controlling depths were 6 feet (7½ at midchannel) through the mouth of the river to Clinton Harbor Inner Light with 5 feet in the basin; thence in 1985, the centerline controlling depth was 5 feet upstream to Bridgeview Avenue bridge, and thence 3 feet on the centerline to Cass Avenue bridge at Mount Clemens.

The controlling depth in the river above Mount Clemens is 2 feet, and the river is navigable by small boats for a considerable distance above Mount Clemens.

Fluctuations of water level.–Winds cause day-to-day level changes of sometimes more than 1 foot. Each year, spring freshets raise the water level at Mount Clemens from 6 to 9 feet above normal.

Caution.–The entrance channel should not be approached from the S because of an obstruction, covered 4 feet, 0.4 mile ESE of the S breakwater. Small craft are cautioned not to navigate between the dredged channel and the N breakwater, because of very shallow water.

Weather.–(See page T-8 for **Mount Clemens climatological table.**)

A **slow-no wake speed** is enforced on the Clinton River.

Small-craft facilities.–Numerous marinas on the Clinton River provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Hoists to 100 tons are available for hull and engine repairs.

Detroit Coast Guard Air Station is at Selfridge Air National Guard Base on the W side of Anchor Bay N of the Clinton River. Two basins for crash rescue craft are 2.4 and 3 miles NW of the Clinton River mouth. The SE basin is protected by a detached breakwater marked by three private lights, and the NW basin is marked by a private **261°** lighted range that operates when the crash boats are deployed.

The shore, N and NE of Selfridge Air National Guard Base, is indented by several small creeks and privately dredged canals developed for housing and small-craft facilities. A **slow-no wake speed** is enforced on these waterways.

Salt River flows into the NW side of Anchor Bay about 4 miles N of the Clinton River mouth. The entrance to the river is marked by private lights on either side of the mouth and a private **018°** lighted range. In 1977, the reported controlling depth was 3 feet through the entrance upstream for 2,000 feet. Several submerged concrete remains of former light structures are in the entrance channel; caution is advised. A **slow-no wake speed** is enforced in the Salt River. Marinas in the lower part of the river provide gasoline, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, and a 40-ton hoist.

New Baltimore, Mich., is on the N side of Anchor Bay at the mouth of **Frog Creek** about 5.5 miles NNE of the Clinton River. A **slow-no wake speed** is enforced in Frog Creek and in the small-craft channels at New Baltimore E of the creek. Marinas at New Baltimore provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 15-ton lift is available for hull, engine, and electronic repairs.

Fair Haven, Mich., is a village on the NE shore of Anchor Bay at the mouth of **Swan Creek** about 4 miles E of New Baltimore. Several privately dredged canals lead to marinas off both sides of the lower part of the creek. The approach to the creek is marked by buoys, and the mouth of the creek is marked by private lights. In 1977, the reported controlling depth in Swan Creek was 4 feet. A **slow-no wake speed** is enforced in the creek and canals. The marinas provide transient berths, gasoline, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. An 18-ton hoist is available for hull and engine repairs.

The E side of Anchor Bay, from Fair Haven S, is a wide shallow area receiving the outflow from North Channel and Middle Channel of the St. Clair River.

The St. Clair River flows into the NE side of Lake St. Clair through numerous channels. The delta

Structures across Clinton River to Mount Clemens

**Miles above Clinton River Inner Light*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
1	Overhead cable	Telephone	3.48				25	
2	Bridgeview Ave. bridge	Highway	3.50			50	21	Fixed.
3	Overhead cables	Power	3.52				30	
4	Overhead cables	Power & telephone	5.85				40	
5	Overhead cable		5.94					Data not available.
6	Edsel Ford Freeway I-94 bridge	Highway	5.95			55	28	Twin fixed.
7	Overhead cable	Power	6.58				46	
8	Market St. bridge	Highway	7.20			78	14	Fixed.
9	Cass Ave. bridge	Highway	7.32			64	20	Fixed.
10	Overhead cable	Power	7.45				58	
	Junction with Cutoff Canal		9.00					
11	S. Broadway bridge	Highway	9.30			74	15	Fixed.
12	Overhead cable		9.37					Data not available.
13	Gratiot Ave. bridge	Highway	9.38				14	Fixed. Head of navigation.

region of the river, from North Channel SE to Chenal Ecarte, is described in chapter 9, St. Clair River.

Mitchell Bay is a shallow bight at the NE corner of Lake St. Clair between the mouth of Chenal Ecarte on the N and **Mitchell Point** (42°26.6'N., 82°26.0'W.) on the S. A dredged channel leads N across the mouth of Mitchell Bay to the mouth of Chenal Ecarte. The channel, marked by buoys and a directional light showing a **354°41'–355°19'** white sector on **Martin Island** on the W side of the mouth of Chenal Ecarte, had a controlling depth of 2½ feet in 1973. A 325-foot Government wharf is at the village of **Mitchell Bay, Ont.**, on the E side of the bay. A marina N of the wharf provides gasoline and water. The preferred route to the wharf is from the E entrance to Chenal Ecarte, a cut 1.3 miles NE of Martin Island, through a buoyed channel leading S, thence ESE in a channel marked by a directional light showing a **105°–107°** white sector, thence NE through the entrance to the wharf. In 1973, the controlling depth in the channels was 1½ feet, however, all the channels in the bay are subject to considerable shoaling. The buoys are sometimes shifted to mark the best water. Four piles that bare are off the outer end of the wharf.

Patricks Cove, at the S end of Mitchell Bay E of Mitchell Point, has two marinas that provide gasoline, water, and the usual small-craft facilities.

The E shore of Lake St. Clair, from Mitchell Point S to the Thames River, is flat and marshy.

Thames River empties into the SE corner of Lake St. Clair. A dredged channel, marked by buoys and a **147°** lighted range, leads through shallows in the lake to the river mouth. In 1983, the river was reported to have been dredged to 8 feet, but the channel is subject to shoaling and the buoys are sometimes moved to mark the best water. A depth of about 5 feet can be carried from the mouth of the river upstream for about 18.5 miles to **Chatham, Ont.**, thence to **Louisville, Ont.**, 7 miles above Chatham. A **speed limit** of 5 mph (4.3 knots) is enforced between the mouth of the river and Chatham. A 185-foot Government wharf on the S side of the river mouth has depths of 14 feet along the outer face. The NW and SE faces have depths of 8½ and 13 feet, respectively, decreasing toward shore. A marina adjacent to the Government wharf provides berths with electricity, gasoline, water, and ice. A **Canadian customs vessel reporting station** is at the marina. A bascule bridge with a reported clearance of 15 feet crosses the river about 8 miles above the mouth.

The S shore of the lake from the Thames River W to the Detroit River is generally flat and sandy with scattered boulders.

Stoney Point is a rounding projection 5 miles W of the Thames River. A church spire 1 mile SSE of the point is prominent.

Ruscom River flows into the S side of Lake St. Clair about 16 miles E of the head of the Detroit River. The approach channel to the river, marked by buoys that are moved periodically to mark the best water, has a depth of 6½ feet. A submerged spoil bank extends N along the W side of the approach channel. The railroad bridge about 0.15 mile above the entrance has a clearance of 10 feet. A small-craft basin inside the mouth of the river has depths of about 5 feet. In 1978, severe shoaling was reported in the channels. Marinas in the basin provide gasoline, water, and most small-craft facilities.

Belle River, Ont., is a village at the mouth of the **Belle River** about 11 miles E of the Detroit River. A green water tank in the village is prominent. The entrance to the river, between parallel revetment walls, had a controlling depth of 6½ feet in 1973. A light is off the entrance. A dredged small-craft basin on the W side of the river mouth has a depth of about 6½ feet. A **Canadian customs vessel reporting station** is at the village. Two marinas in the Belle River provide berths, gasoline, water, launching ramps, and most small-craft facilities.

Puce River, about 8 miles E of the Detroit River, is entered between parallel training walls marked on the outer ends by lights. The entrance channel is 40 feet wide with a depth of about 4½ feet. A marina inside the entrance provides berths with electricity, gasoline, water, ice, sewage pump-out, a launching ramp, and a 16½-ton hoist.

Pike Creek is entered through a channel between two training walls about 4.5 miles E of the Detroit River. The outer end of the W wall and the E side of creek entrance are marked by lights, and the approach channel is marked by buoys. The entrance channel is 40 feet wide with a depth of about 5 feet. The entrance is subject to continual change and the buoys marking the channel are frequently shifted to mark the best water. Marinas in the creek provide gasoline, diesel fuel, water, ice, a launching ramp, and a marine railway that can handle craft to 11 tons.

A white water tank 1.1 miles SSE of the Pike Creek mouth is prominent. The old Pelee Passage lighthouse (42°20.4'N., 82°55.9'W.) on the E side of Windsor has been restored by private interests and is also prominent.

9. ST. CLAIR RIVER

Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to the sloping surface of the river corresponding to a Lake Huron stage of 576.8 feet and a Lake St. Clair stage of 571.7 feet above mean water level at Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955), which elevations are the planes of Low Water Datum for the two lakes. (See Chart Datum, chapter 1.)

General description.–**St. Clair River** is about 39 miles long from Lake St. Clair via St. Clair Cutoff Channel and South Channel to the head of the river at Lake Huron. The lower 11 miles of the river is a broad delta through which numerous channels flow into Lake St. Clair. South Channel and St. Clair Cutoff Channel form the main navigation route through the delta and connect with the dredged channel across Lake St. Clair. The upper river, above Chenal Ecarte, is generally a single deep channel, except where obstructed by Fawn Island and Stag Island. The banks of the river are clay and sand and usually quite steep.

Channels.–The channel through St. Clair River has been improved in places by dredging. The Federal project depth in the river is 27 feet.

Fluctuations of water level.–Each year the St. Clair River has a seasonal rise and fall of about 1 foot, generally in consonance with the seasonal variations of Lake Huron. High winds may cause rapid fluctuations of up to 2 feet above or below normal.

Currents.–The following currents are based on averages of water flow through the entire cross section of the river, that is from bank to bank and from the surface to the bottom during normal flow conditions. Normal water flow conditions are encountered when there is no wind, Lake Huron is at a stage of 578.2 feet, and Lake St. Clair is at a stage of 573.3 feet above mean water level at Pointe-au-Pere (Father Point), Quebec, on the International Great Lakes Datum (1955), that is 1.4 feet and 1.6 feet above their respective Low Water Datums. The current encountered at midstream is usually about 1.5 times the average velocity. Greater velocities may be expected when the difference between the lake levels is greater, or the lake stages are higher.

Currents for the following locations in the St. Clair River are given at high water flow of 230,000 cubic feet per second (cfs), medium water flow of 188,000 cfs, and low water flow of 130,000 cfs, respectively.

Algonac: 2.0 mph (1.7 knots), 1.6 mph (1.4 knots), and 1.3 mph (1.1 knots)

Port Lambton: 2.0 mph (1.8 knots), 1.7 mph (1.5 knots), and 1.3 mph (1.1 knots)

Marine City: 2.0 mph (1.7 knots), 1.6 mph (1.4 knots), and 1.3 mph (1.1 knots)

St. Clair: 2.1 mph (1.9 knots), 1.8 mph (1.5 knots), and 1.4 mph (1.2 knots)

Marysville: 1.9 mph (1.7 knots), 1.6 mph (1.4 knots), and 1.3 mph (1.1 knots)

Point Edward: 3.9 mph (3.4 knots), 3.3 mph (2.9 knots), and 2.5 mph (2.2 knots).

The rapids section extends from about 1,000 feet above to 200 or 300 feet below the Blue Water Bridge. During periods of sustained high N to NE winds on Lake Huron, velocities in the upper St. Clair River are increased.

Ice.–The only need for icebreaking in the St. Clair River occurs when the ice bridge that forms across the S end of Lake Huron breaks and the broken mass of ice travels down the river to the lower end where it meets the natural ice cover and forms a massive ice jam. When this occurs, ice can clog the entire 27-foot depth of the channel and cause serious flooding. (See Winter Navigation, chapter 3.)

Navigation regulations.–The State of Michigan enforces the following speed limits for recreational craft within its jurisdictional boundaries from the mouth of Black River downsteam to the mouth of St. Clair River: slow-no wake for vessels less than 26 feet long within 200 feet of any shore, dock, or pierhead, and slow-no wake for vessels 26 feet or longer within 600 feet of any shore, dock, or pierhead.

A vessel traffic reporting system and related navigation regulations have been established for the connecting waters from Lake Erie to Lake Huron. (See **33 CFR 162.130 through 162.140,** chapter 2, for regulations.)

Vessel Traffic Service.–The Canadian Coast Guard operates a Vessel Traffic Service in Canadian waters from Long Point in Lake Erie through the Detroit and St. Clair Rivers to De Tour Reef Light in Lake Huron. (See chapter 3 and the Annual Edition of Canadian Notices to Mariners for complete information.)

Pilotage.–The waters of St. Clair River are Great Lakes designated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. Registered pilots for St. Clair River are supplied by Lakes Pilots Association. (See appendix for address.) Pilot exchange points are just below the Ambassador Bridge in Detroit River and off Port Huron at the head of St. Clair River in about 43°05'30"N., 82°24'42"W. The pilot boat in Detroit River, J.W. WESTCOTT II, has a black hull encircled by an orange band and a white cabin with the words "U.S. Mail" in black letters. Three pilot boats are at Port Huron: HURON BELLE has an international orange hull with an aluminum cabin, and HURON MAID and HURON LADY each have an international orange hull with a white cabin. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

Charts 14850, 14852, 14853.–St. Clair River flows S from Lake Huron and empties into the NE side of Lake St. Clair. The mouth of the river is an extensive delta providing numerous outlets into the lake.

Chenal Ecarte, the easternmost part of the delta, flows SE from its junction with St. Clair River at Baby Point (42°38.5'N., 82°30.2'W.) for about 18 miles to the NE part of Lake St. Clair. The entrance from the river is marked by buoys and a **138°20'** lighted range and thence the channel is marked by daybeacons to the junction with Sydenham River. Chenal Ecarte is narrow and winding and should only be navigated by those with local knowledge. The controlling depth in Chenal Ecarte is about 8 feet. A **speed limit** of 5 mph (4.3 knots) is enforced on Chenal Ecarte.

Route 40 highway bridge, a swing span with a reported clearance of 12 feet, crosses Chenal Ecarte 4 miles below the junction with St. Clair River. The bridge is opened on the hour during daylight hours by arrangement at other times. The bridge is operated by the Department of Indian Affairs and Northern Development; telephone, 519-679-4040. (See appendix for address.)

An overhead power cable with a reported clearance of 20 feet crosses Chenal Ecarte about 1.7 miles below the junction with Sydenham River.

Cable ferries.–Cable ferries cross Chenal Ecarte 1.3 miles above and 1.9 miles below the junction with Sydenham River. Caution should be exercised when navigating in the vicinity of these ferries; the cables may be above the water surface, or just below the surface between the ferry and the river banks. DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.

Sydenham River flows into Chenal Ecarte 9.3 miles below the junction with St. Clair River. A **speed limit** of 5 mph (4.3 knots) is enforced on the river. A Government wharf is on the W side of the river about 1.3 miles above the mouth. The 134-foot wharf has a depth of about 19 feet alongside. A small turning basin is just above the wharf. The St. Clair Grain and Feed Co. Elevator Wharf on the E side of the river opposite the Government wharf is about 450 feet long with a depth of 17 feet alongside. **Wallaceburg, Ont.**, is an industrial town about 2.5 miles above the mouth of Sydenham River. The Chesapeake and Ohio Railway bridge crossing the river at Wallaceburg has a swing span with unknown clearance. The St. Clair Grain and Feed Co. slip about 0.5 mile below the bridge has a depth of about 18 feet. A marina at Wallaceburg provides gasoline, water, ice, electricity, and engine repairs.

Johnston Channel branches S from Chenal Ecarte about 6 miles below the junction with St. Clair River and extends for 13 miles to depths of 1 to 2 feet in the marshy flats of Lake St. Clair. **St. Anne Island** is between Johnston Channel and lower Chenal Ecarte. **Walpole Island** lies W of Johnston Channel and upper Chenal Ecarte. Several dredged cuts flow S through Walpole Island. **Chematogan Channel** forms the W side of Walpole Island and separates it from **Squirrel Island. Bassett Channel** separates the W side of Squirrel Island from **Bassett Island.**

St. Clair Cutoff Channel, the main vessel route through the St. Clair River delta, extends ENE from the N end of Lake St. Clair ship channel for about 6 miles between **Seaway Island** and Bassett Island to its junction with South Channel at the SE end of Harsens Island. The channel is maintained by the Canadian Government and is well marked by lighted and unlighted buoys, lights, and a **064°15'** lighted range on Squirrel Island.

In 1977-September 1984, the controlling depth was 25 feet for a midwidth of 600 feet, except for shoaling of 7 to 20 feet along the S edge between Buoys X50 and A14 and to 23 feet in about 42°33'01"N., 82°35'36"W. In June 1983, shoaling to 22 feet was reported along the NW side of the channel between St. Clair Cutoff Channel Pier Light X43 and Harsens Island Light 11.

Vessels are directed not to meet in the St. Clair Cutoff Channel; vessel traffic is managed by the Canadian Coast Guard, Sarnia Vessel Traffic Center, on VHF-FM Channel 11 (156.55 MHz).

Downbound vessels entering St. Clair Cutoff Channel are cautioned to turn well before crossing Squirrel Island Range because of a shoal that extends from the N part of Bassett Island to the SE edge of the channel.

Three diked disposal areas are on the SE side of Seaway Island. Barge landing docks are at the center and E areas. The center and E disposal areas are each marked by a light.

St. Clair Flats Canal extends from the N end of Lake St. Clair ship channel NE for about 1.7 miles along the SW end of Seaway Island to the junction with South Channel. The canal is marked by lighted and unlighted buoys, a light, and a **041°** lighted range. **South Channel** extends from the N end of St. Clair Flats Canal along the NW side of Seaway Island and bends E along the S shore of **Harsens Island** to the junction with St. Clair Cutoff Channel at **Southeast Bend.** This section of South Channel is well marked by lights.

St. Clair Flats Canal and South Channel below Southeast Bend have good available depths but have not been maintained for deep-draft navigation since completion of St. Clair Cutoff Channel. The U.S. side of South Channel has been extensively developed with summer cottages and small-craft landings. **St. Clair Flats Coast Guard Station** is on the W side of South Channel at the St. Clair Flats Canal Range front light.

Caution.–The earth dike along the SE edge of St. Clair Flats Canal S entrance is reported to be submerged during periodic high water conditions. It is reported that several small boats have struck the dike when it was submerged. Mariners are advised to use caution in this area.

From the junction with St. Clair Cutoff Channel, South Channel leads NNE for about 6.5 miles to the junction with North Channel. The channel is well marked by lighted and unlighted buoys, lights, and lighted ranges, and is maintained at the Federal project depth of 27 feet. In April 1982, shoaling to an unknown extent was reported in the vicinity of Buoy 16.

In July 1978, a sunken wreck was reported at the junction of South Channel with Bassett Channel in about 42°33.2'N., 82°35.2'W.

Currents.–Vessels transiting South Channel are advised to favor the E side of the channel N of Russell Island, because the current flows strongly from the main river channel into North Channel.

Russell Island is on the W side of South Channel just below the junction with North Channel. A shallow bank extends about 0.5 mile NNE from the head of the island. A lighted buoy marks the NE side of the shoal.

North Channel, the northwesternmost part of the St. Clair River delta, branches W from the river just N of Russell Island, flows along the N side of Harsens Island and **Dickinson Island,** and empties into the E side of Anchor Bay. The outlet of the channel in the shallow water of Anchor Bay is well marked by buoys. Two irregularly shaped diked disposal areas front the channel on the N side of Dickinson Island.

Chenal A Bout Rond branches SW from North Channel at the W end of Dickinson Island and flows into Anchor Bay.

Middle Channel leads SW from North Channel between Harsens Island and Dickinson Island. The outlet in Lake St. Clair is marked by lighted and unlighted buoys. A 22-acre diked disposal area is on the W side of Harsens Island about 1.2 miles below the junction with North Channel.

Algonac, Mich., is a summer resort at the head of North Channel opposite Russell Island. Marinas at Algonac provide transient berths, gasoline, water, ice, electricity, marine supplies, and a launching ramp. A 20-ton hoist is available for hull and engine repairs. Ferries operate from Algonac to Harsens Island, Russell Island, and Walpole Island.

Algonac is a **customs station.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

A **slow-no wake speed** is enforced on the channels and canals at Algonac.

A ferry landing is on the NW side of Walpole Island opposite the upper end of Russell Island. Breakwaters protect the 105-foot wharf on the N and S sides. A light marks the W end of the detached N breakwater. A ferry operates from the wharf to Algonac. A **Canadian customs vessel reporting station** is at the wharf.

From the junction with North Channel, the dredged channel of the St. Clair River extends upstream for about 7 miles to a point about 1.3 miles above Fawn Island. The channel passes W of Fawn Island and is well marked by lighted buoys and lights. The channel is maintained at the Federal project depth of 27 feet.

In April 1982, shoaling to an unknown extent was reported in the vicinity of Fawn Island Lighted Buoy 38.

Port Lambton, Ont., a village on the E side of the river about 1 mile above the junction with Chenal Ecarte, has a 125-foot Government wharf with a reported depth alongside of about 12 feet. A ferry operates from the wharf across the river to Roberts Landing. A marina is close S of the Government wharf. A **Canadian customs vessel reporting station** is at Port Lambton.

Roberts Landing, Mich., on the W side of the river 3 miles above Russell Island, is a **customs station.** A ferry operates across the river to Port Lambton.

About 1.7 miles above Port Lambton, a shoal with a least depth of 15 feet is in midriver along the E limit of the dredged channel. A lighted buoy off the S end of the shoal marks the limit of the dredged channel.

Fawn Island is off the Canadian side of the river about 3 miles above Port Lambton. Shoals with depths to 1 foot extend 0.4 mile SSW and NNE from the island. A buoy marks the S end of the shoals S of Fawn Island. A shoal with a least depth of 5 feet extends along the E limit of the dredged channel from about 0.3 to 1.3 miles N of Fawn Island with a deep channel between. An unmarked channel with a least depth of about 18 feet passes E of Fawn Island and the shoals. The channel is slightly winding and is not frequently used; the dredged channel W of Fawn Island is the preferred route.

Marine City, Mich., is on the W side of the river 7 miles above Russell Island. **Belle River** flows S through the town and empties into the St. Clair River NW of Fawn Island. A ferry operates between Marine City and Sombra, Ont.

Channels.–In 1985, the centerline controlling depth was 5½ feet from the mouth of Belle River to about 60 feet below the Bridge Street bridge, thence 3 feet to the Broadway bridge. The channel is subject to shoaling.

Bridges.–Bridge Street bridge, about 0.5 mile above the mouth of Belle River, has a 28-foot fixed W span with a clearance of 13 feet. Broadway bridge, about 1.1 miles above the river mouth, has a fixed span with a clearance of 7 feet. Several overhead cables in the lower 2 miles of the river have a least clearance of 37 feet.

Marine City is a **customs station.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Harbor regulations.–A **slow-no wake speed** is enforced on the Belle River. The Marine City Chief of Police acts as harbormaster and enforces the regulations of St. Clair County and the State of Michigan.

Copies of the regulations may be obtained from the chief of police.

Wharf.–McLouth Yards, Inc. receives crushed limestone and coal at a wharf on the W side of the St. Clair River just below the mouth of Belle River. There is 1,200 feet of berthing space along the reinforced natural bank with a reported depth of 35 feet alongside and a deck height of 5 to 8 feet. The facility has 12 acres of open storage.

Small-craft facilities.–Marinas on the W side of the Belle River within 0.5 mile of the mouth provide gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 20-ton hoist can handle 42-foot vessels for hull, engine, and electronic repairs.

Ferry.–A ferry operates year round, depending on ice conditions, from Marine City, about 0.6 mile NNE of the mouth of Belle River, across the St. Clair River to Sombra, Ont.

Sombra, Ont., is a small village on the E side of the St. Clair River opposite Marine City. A causeway connects the mainland and the 300-foot offshore Government wharf at Sombra. A ferry operates from the N side of the wharf to Marine City, and small-craft berths are available on the S side of the wharf. Sombra is a **Canadian customs vessel reporting station.**

From a point 1.3 miles above Fawn Island, the channel through the St. Clair River is a natural deepwater channel 0.2 to 0.4 mile wide upstream for 6.5 miles to the lower end of St. Clair Middle Ground. The channel is marked by lighted buoys and lights.

At **Stokes Point** (42°44.1'N., 82°28.7'W.), 1.5 miles above Sombra, a pier connects the mainland and an offshore wharf with a 120-foot face and depths of about 15 feet alongside. A light marks the SW corner of the wharf. In 1982, the wharf was reported to be in ruins.

Detroit Edison Co. has a powerplant with two wharves on the W side of the St. Clair River about 2 miles above Stokes Point. Several stacks at the plant are prominent, and private lights mark the upper and lower ends of the wharf area.

Wharf 1: 500 feet below Dock Upper Light; about 400 feet of berthing space; 16 feet reported alongside; deck height, about 8½ feet; storage tanks for over 11 million gallons of #2 and #6 fuel oil; receipt of fuel oil and bunkering vessels.

Wharf 2: adjacent N of Dock Lower Light; 1,069 feet of berthing space; 29 feet reported alongside; deck height, 8½ feet; open storage for over 2½ million tons of coal; two receiving hoppers, operating rates 2,400 and 10,000 tons per hour; receipt of coal and bunkering vessels.

Overhead power cables with clearances of 154 and 163 feet cross the river just above and 1.8 miles above the Detroit Edison Co. wharves, respectively.

Lambton Generating Station is on the E side of the river about 2 miles above the Detroit Edison Co. wharves. Coal is received at a 1,000-foot offshore wharf. In 1977, depths of 28 feet were reported alongside.

St. Clair, Mich., is on the W side of the river about 7.5 miles above Marine City. **Pine River** is a stream 100 to 150 feet wide, emptying into the St. Clair River near the S limits of the city. The St. Clair Inn and Country Club 0.5 mile N of the mouth of Pine River is prominent.

In May 1985, the centerline controlling depths in Pine River were 6½ feet through the mouth to 200 feet above the Riverside Avenue bridge, thence 3½ feet to 0.9 mile above the mouth; thence in 1981, 5 feet to 1.1 miles above the mouth. The channel is subject to shoaling.

Bridges.–Riverside Avenue (State Route 29) bascule bridge, just above the mouth of the Pine River has a clearance of 11 feet. (See **33 CFR 117.1 through 117.59 and 117.643,** chapter 2, for drawbridge regulations.) The Port Huron and Detroit Railroad bridge about 2 miles above the river mouth has a swing span with a clearance of 11 feet. Several overhead cables cross the river.

A **slow-no wake speed** is enforced on the Pine River.

Wharf.–Diamond Crystal Salt Co. receives salt and coal at a wharf on the W side of the St. Clair River just below the mouth of the Pine River. The wharf has 1,085 feet of berthing space with reported depths of 16 to 19 feet alongside and a deck height of 7½ feet. The wharf has 1.1 acres of open storage for 55,000 tons of coal and 7,500 tons of salt.

Small-craft facilities.–The city of St. Clair and the Michigan State Waterways Commission have jointly developed docking and launching facilities on the Pine River immediately upstream of the M-29 Highway Bridge. Gasoline, diesel fuel, water, ice, electricity and sewage pump-out are available. In 1977, depths of 3 to 15 feet were reported available at the facility. Another facility on the W side of the river about 1.4 miles above the mouth provides gasoline, diesel fuel, water, ice, electricity, marine supplies, sewage pump-out, and a launching ramp. A 30-ton hoist is available for hull, engine, and electronic repairs.

St. Clair Middle Ground, a shoal with a least depth of 1 foot, is in midriver from just below the mouth of Pine River N for about 1.5 miles to opposite Mooretown, Ont. Lighted buoys mark the shoal at its upper and lower ends and on the W side.

From the lower end of St. Clair Middle Ground, the dredged channel of the St. Clair River leads W of the middle ground and upstream for about 12.5 miles to just above the mouth of the Black River, thence for about 1.5 miles through natural deep water to the head of the river at Lake Huron. This section of the river is marked by lighted and unlighted buoys and lights, and is maintained at the Federal project depth of 27 feet.

Downbound vessels should exercise caution when negotiating the westerly turn at the upper end of St. Clair Middle Ground to avoid striking these shoals. The channel to the E of the middle ground, formerly for upbound channel, had a controlling depth of 24 feet in 1961, but is not being maintained.

Courtright, Ont., is a village on the E side of the river opposite St. Clair. The wharves at the village, mostly in ruins, have depths of 15 to 20 feet alongside.

Mooretown, Ont., is on the E side of the river 1.5 miles above Courtright. The town wharf, marked by a light, has depths of 12 feet at the outer end.

Stag Island is off the Canadian side of the river about 3 miles above St. Clair Middle Ground. The main vessel channel is along the U.S. shore W of Stag Island. Shoals extend about 0.8 mile S and 0.6 mile N from the island and are marked at the outer ends by lighted buoys. **Stag Island Shoal Light** is about midlength of the shoals off the S end of the island.

A small-craft facility on the W side of the St. Clair River opposite the foot of Stag Island provides gasoline, water, and electricity.

The Canadian channel E of Stag Island, formerly the upbound channel, had a controlling depth of 21 feet in 1950, but is no longer maintained. A **167°15′** lighted range marks the approach to Corunna, Ont., through the upper entrance to the channel and past the shoals off the mouth of **Talford Creek.**

Corunna, Ont., is a village on the Canadian channel E of Stag Island. A ferry operates from Corunna to the E side of Stag Island.

Wharf.–Shell Canada, Ltd. operates a 2,000-foot offshore wharf on the E side of St. Clair River N of the mouth of Talford Creek. Petroleum products are shipped and received, and bunkering is available.

Detroit Edison Marysville Power Plant wharves are on the W side of the river about 2 miles above Stag Island.

Wharf 1: (42°55′22″N., 82°27′37″W.); 340 feet of berthing space; 18 feet alongside; deck height, 9 feet; open storage for 167,000 tons of coal; receipt of coal.

Wharf 2: 500 feet above Wharf 1; 400 feet of berthing space; 22 feet alongside; deck height, 9 feet; open storage for 53,000 tons of coal; receipt of coal.

A buoy marks the S side of a 16-foot shoal on the E side of the St. Clair River oppsite Detroit Edison Marysville Power Plant Wharf 1.

An overhead power cable with a clearance of 177 feet crosses the St. Clair River 1.9 miles above Stag Island.

The upper part of the St. Clair River flows S between the cities of Port Huron, Mich., and Sarnia, Ont. The head of the river is entered from a dredged channel that leads through the shallow lower end of Lake Huron. A **180°20′** lighted range on the E side of the head of the river marks the approach to the river through this channel. A radar beacon (RACON) is at the front light. (See Racons, chapter 1, for additional information.) **Fort Gratiot Light** (43°00.4′N., 82°25.3′W.), 82 feet above the water, is shown from a white conical tower on the W side of the river head. A radiobeacon is near the light.

Blue Water Bridge, a fixed highway bridge with a clearance of 155 feet at the center decreasing to 135 feet 300 feet from the center, crosses the river just below the head. The bridge is prominent in approaching the river.

Caution.–Currents in the upper part of the river are considerable, at times 5 mph or more above the Blue Water Bridge and 4 mph or more for 1 mile below the bridge. Upbound vessels will experience a W set between the Blue Water Bridge and Lake Huron Cut Lighted Buoys 1 and 2. Mariners should use the lowest possible safe speed in this reach to avoid damage to wharves and moored vessels.

A **207½°** lighted range on the W side of the river 0.5 mile below the Blue Water Bridge marks the channel through the head of the river to just below the bridge.

Bay Point is a long narrow point that extends S along the E side of the river about 1.4 miles below the head. A buoy marks submerged ruins off the S end of the point. A lighted buoy marks an 18-foot shoal off the W side of the inner end of the point.

Caution.–An alternating one-way traffic zone is between Lake Huron Cut Lighted Buoy 1 and Port Huron Traffic Lighted Buoy. (See **33 CFR 162.134 (c)(2),** chapter 2, for regulations.)

Anchorage.–Good anchorage, clay and gravel bottom, is abreast of Sarnia below the section of the rapids near the Blue Water Bridge. Good holding ground and some eddy will be found near the Canadian shore below the Canadian National Railways Wharf. Vessels should anchor as close to shore as possible to leave the midchannel clear for passing vessels.

A railroad tunnel crosses under the river about 1 mile below the mouth of the Black River. Two ferries cross the river between Port Huron and Sarnia in the vicinity of the tunnel.

Port Huron, Mich., a city at the S end of Lake Huron, fronts the W side of the upper part of the St. Clair River. **Black River** flows SE through the city and empties into the St. Clair River 2.4 miles below its head.

Channels.–A dredged channel leads from the mouth of Black River upstream to about 0.4 mile above the Grand Trunk Western Railroad bridge. In May 1984, the centerline controlling depths were 12 feet from the mouth to the 10th Street bridge, thence 5½ feet to the railroad bridge, thence 5 feet to the head of the project, thence 3 feet to the I-94 bridge, thence 1 foot on centerline to the Black River Canal. The channel is subject to shoaling. A light marks the N side of the mouth of the river.

Fluctuations of Water Level.–Each year spring freshets cause the level of the Black River to rise and fall from 4 to 6 feet. Day-to-day level changes due to wind can amount to several inches.

Port Huron is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard.–Port Huron Coast Guard Station is on the W side of the head of the St. Clair River just S of Fort Gratiot Light. **Storm warning signals are displayed.** (See chart.)

Harbor Regulations.–**A slow-no wake speed** is en-

Structures across Black River at Port Huron

**Miles above the mouth of the river*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
1	Chesapeake & Ohio Ry. bridge	Railroad	0.09			100	6	Bascule. Note 1.
2	Military St. bridge	Highway	0.33			65	10	Bascule. Note 1.
3	7th St. bridge	Highway	0.50			83	12	Bascule. Note 1.
4	10th St. bridge	Highway	0.94			90	18	Bascule. Note 1.
5	Grand Trunk Western RR bridge	Railroad	1.56			80	14	Bascule. Note 1.
6	Overhead cable	Power	1.76				63	
7	Overhead cable	Telephone	2.05				40	
8	I-94 bridge	Highway	2.30			117	20	Fixed.
9	Overhead cable	Telephone	2.33				40	
10	Overhead cable	Power	2.50				46	
11	Overhead cable	Power	2.85				64	
	Junction with Black River Canal		4.34					
12	Overhead cable	Power	4.41				41	

Note 1.–See 33 CFR 117.1 through 117.59 and 117.625, chapter 2, for drawbridge regulations.

forced on the following sections of Black River: from the mouth upstream to the Grand Trunk Western Railroad bridge, from 600 feet below to 800 feet above the I-94 bridge, and from 1,000 feet below to 500 feet above the intersection with the Black River Canal.

Towage.–Tugs for Port Huron are available from Detroit. (See Towage under Detroit.)

Wharves.–Port Huron has four deep-draft facilities. The alongside depths given are reported depths.

Port Huron Terminal Co. Wharf: (42°57'32"N., 82°25'36"W.); 950-foot face; 25 to 29 feet alongside; deck height, 8 feet; 50,000 square feet covered storage; 100,000 square feet open storage; two 18-ton cranes; rail and water connections; receipt of general cargo, wood pulp, and beans; owned by city of Port Huron and operated by Port Huron Terminal Co.

Winkworth Transit Co. Wharf: (42°58'17"N., 82°25'12"W.); about 1,500 feet of berthing space; 27 feet alongside; deck height, 8 feet; 50,000 square feet open storage; cranes to 60 tons; rail connections; receipt of crushed limestone and salt; owned and operated by Winkworth Transit Co.

Blue Water Concrete Co. Wharf: N side of mouth of Black River; about 600 feet of berthing space along natural bank; 22 feet alongside; deck height, 6 to 8 feet; open storage for 55,000 tons of stone; receipt of crushed stone; owned and operated by Blue Water Concrete Co.

Blue Water Aggregates Co. Wharf: W side 0.9 mile below the head of St. Clair River; 1,100 feet of berthing space along natural bank; 28 feet alongside; deck height, 6 to 8 feet; open storage for 300,000 tons of stone; rail connections; receipt of crushed stone; owned by city of Port Huron and operated by Blue Water Aggregates Co., Inc.

Small-craft facilities.–The city of Port Huron and the Michigan State Waterways Commission have jointly developed small-craft facilities on the E side of the Black River just below the Military Street Bridge, on the E side of the river below 7th Street bridge, on the E side of the river between 7th and 10th Street bridges, and on the W side of the river below the I-94 bridge. Gasoline, diesel fuel, water, ice, electricity, and sewage pump-out facilities are available. Other marinas in Black River additionally provide launching ramps and lifts to 60 tons for hull, engine, and electronic repairs.

Supplies.–Water and some marine supplies and provisions are available at Port Huron Terminal Co. Wharf. Bunker C and diesel fuel are available at oil company terminals at Sarnia.

Communications.–Port Huron has good highway and rail connections. St. Clair County Airport is 5 miles S of the city.

Sarnia, Ont., a city near the head of the St. Clair River on the E side opposite Port Huron, is a major petroleum refining and chemical producing center. The principal commodities handled at the port are petroleum products, rubber, chemicals, beans, sand, tobacco, grain, fertilizer, steel, lumber, coal, crushed stone, and cement.

A **Canadian customs vessel reporting station** is at Sarnia.

Wharves.–Sarnia has several deep-draft facilities along the E side of the St. Clair River. The alongside depths for the facilities described are reported depths. (For a more complete description of the port facilities, consult the Canadian Sailing Directions, Great Lakes.)

Sun Oil Co. Ltd. Wharf: (42°56'03"N., 82°26'50"W.); 1,000-foot face; 22 feet alongside; shipment of petroleum products.

Dow Chemical Co. Lower Wharf: (42°56'19"N., 82°26'34"W.); 600-foot face; 25 feet alongside; shipment of bulk liquids.

Polymer Corp. Wharf: 0.8 mile above Dow Chemical Co. Lower Wharf; 600-foot face; 24 feet alongside; shipment of bulk liquids.

Imperial Oil Ltd. Wharves: (42°57'39"N., 82°25'00"W.); total of about 2,500 feet of berthing space; 22 to 25 feet alongside; receipt and shipment of petroleum products.

Reid Aggregates Ltd. Wharf: (42°58'56"N., 82°24'52"W.); 440-foot face; 23 feet alongside.

Government Wharf: S side of slip NE of Reid Aggregates Ltd. Wharf; 1,040-foot face; 24 feet alongside; 35,000 square feet covered storage; water and electrical connections.

Sarnia Elevator Wharf: across slip N of Government Wharf; 900-foot face; 22 feet alongside; 47,000 square feet covered storage; 5¾-million-bushel grain elevator and annex; water connections.

Government North Slip East Side Wharf: (42°59'18"N., 82°25'04"W.); row of dolphins provides 1,700 feet of berthing space; 24 feet alongside; mooring of vessels for winter storage and repairs.

Canadian National Railways Wharf: (42°59'36"N., 82°25'20"W.); 1,100-foot face; 18 feet alongside; 75,000 square feet covered storage; water and electrical connections.

Supplies.–All types of marine supplies and fuels are available at Sarnia.

Small-craft facilities.–A marina that extends E from the inner end of the slip on the E side of Bay Point provides gasoline, diesel fuel, water, ice, electricity, sewage pump-out, a launching ramp, and 30-ton hoist.

In 1982, a marina, protected by a breakwater marked at its outer end by a light, was under construction on the N side of **Sarnia Bay** (42°58.8'N., 82°24.6'W.).

Point Edward, Ont., is a village on the E side of the head of the St. Clair River. A yacht club basin at the N end of the village fronts Lake Huron on the E side of the head of the river. The entrance to the basin is protected by two breakwaters on the E side and one on the W side. Private lights and a lighted private range mark the entrance to the basin. Berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, sewage pump-out facilities, and a 5-ton hoist for hull and engine repairs are available.

10. LAKE HURON

Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake Huron is an elevation 576.8 feet above mean water level at Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955). (See Chart Datum, chapter 1.)

Dimensions, etc.

Length, steamer track, De Tour Passage to Fort Gratiot; 223 miles.

Length, steamer track, Straits of Mackinac to Fort Gratiot; 247 miles.

Length (right line), Drummond Island, at nearest point to entrance of False Detour, to Blue Point; 206 miles.

Breadth (right line), on about latitude 44°30'N.; 183 miles.

Depth, maximum recorded by NOS; 750 feet.

Water surface of lake (including St. Marys River below Brush Point, North Channel, and Georgian Bay); 9,100 square miles (U.S.), 13,900 square miles (Canada).

Entire drainage basin (including St. Marys River below Brush Point, North Channel, and Georgian Bay); 25,300 square miles (U.S.), 49,400 square miles (Canada).

General description.–**Lake Huron** is the second largest of the Great Lakes. Three large bays extend from the main body of the lake, Saginaw Bay on the W side and North Channel and Georgian Bay on the NE side. The lake receives the waters of Lake Michigan through the Straits of Mackinac and those of Lake Superior from the St. Marys River. The lake discharges at its S end into St. Clair River at Fort Gratiot. The lake is a connecting link in the Great Lakes chain. The depth of water in St. Marys River, St. Clair River, and Detroit River governs the draft of vessels navigating Lake Huron to and from Lakes Superior and Erie.

Vessel Traffic Service.–The Canadian Coast Guard operates a Vessel Traffic Service in Canadian waters from Long Point in Lake Erie through the Detroit and St. Clair Rivers to De Tour Reef Light in Lake Huron. (See chapter 3 and the Annual Edition of Canadian Notices to Mariners for complete information.)

Fluctuations of water level.–The normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and fall, the lowest stages prevailing during the winter and the highest during the summer.

In addition to the normal seasonal fluctuations, oscillations of irregular amount and duration are also produced by storms. Winds and barometric pressure changes that accompany squalls can produce fluctuations that last from a few minutes to a few hours. At other times, strong winds of sustained speed and direction can produce fluctuations that last a few hours or a day. These winds drive forward a greater volume of surface water than can be carried off by the lower return currents, thus raising the water level on the lee shore and lowering it on the windward shore. This effect is more pronounced in bays and at the extremities of the lake, where the impelled water is concentrated in a small space by converging shores, especially if coupled with a gradually sloping inshore bottom which even further reduces the flow of the lower return currents. This condition is very pronounced at the mouth of Saginaw River.

Weather.–Gales are most frequent in autumn. By late summer there is a noticeable increase, lakewide, in the frequency of gales, and this increase continues until the end of the navigation season. During November and December, gales are blowing 5 to 10 percent of the time, while windspeeds of 28 knots or more may be encountered up to 23 percent of the time. These winds are mainly generated by winter storms; their frequency falls dramatically in spring. By June and July, gales are expected less than 1 percent of the time, while winds of 28 knots or more blow less than 3 percent of the time. However, squall lines and thunderstorms can produce violent short-period winds from spring through fall. For example, the strongest measured wind on Lake Huron's open waters occurred in August 1965 and was measured at 95 knots from WNW. Shoreline extremes range from 43 to 53 knots. Directions of these extremes are often out of the SW; but W, NW, and NE winds have set some of these records. Most of the records were set from late fall through late winter.

The shape of Lake Huron is such that strong winds from any quarter may generate rough seas somewhere on the lake. S through W winds are common in early autumn, while westerlies and southwesterlies prevail in late autumn. W through NW winds are often the strongest. Winds from a northerly quadrant can raise dangerous seas in the S, especially near the S outlet of the lake. In the central waters a long fetch of strong easterlies or northeasterlies can generate high seas along the Michigan shore, which run athwart the N-S traffic through the lake. Southerlies can be dangerous particularly near the converging N shore. If the fetch and duration are sufficient, waves of 10 feet or more can be generated in open waters by winds from any direction once they reach 20 knots or more. This occurs most often during October, November, and December, when waves of 10 feet or more can be expected 2 to 4 percent of the time in the NW and S parts of the lake and 4 to 7 percent in the wide central portion. Extreme waves of 20 to 22 feet have been encountered throughout the lake.

Dense fog plagues the mariner most often in spring and early summer over the open lake waters. From April into July visibilities drop below 0.5 mile up to 11 percent of the time. May and June are the worst times, and the cold, central waters are the most likely place. These fogs are usually the result of warm air moving across the still cold lake. They often come on winds with a southerly component; but NW, NE, and E winds also bring them. Fog is most prevalent and thickest during the morning hours. Rain, blowing snow and low clouds also reduce visibilities, particularly from late fall through early spring.

Thunderstorms are most frequent from April through October, with peak activity during June, July, and August. Over the open water during this peak season thunderstorms are encountered 2 percent of the time. They are most likely between midnight and sunrise. Onshore thunderstorms can be expected on 4 to 7 days per month in the summer months. They are most likely during the late afternoon.

Ice.–The central part of Lake Huron is mainly an open water area, but drifting patches of thin ice may be present from early February until mid-March. These patches drift S toward the St. Clair River. An ice bridge forms across the head of the river. Ice accumulates to a depth of 12 to 18 inches above the ice bridge; the bridge itself achieves a much greater thickness. The ice bridge is occasionally broken by high winds.

In North Channel, fast ice forms in mid-January and reaches a thickness of 25 to 30 inches by mid-March, then decays rapidly and clears by mid-April. In Georgian Bay, ice begins to form near the end of December, and fast ice is well established by early January. The cover spreads over the entire bay by the end of January, but although concentrations are high, the ice is moved around by the wind to form leads and dispersed ice areas. This ice usually reaches the thick category during the first half of March. Decay begins in mid-March; the ice melts within the bay, and the area is clear by mid-April. Rotting fast ice may be present in some areas until the end of April.

The Straits of Mackinac is subject to severe problem ice conditions. The area is very susceptible to wind action, and the ice cover is unpredictable. Ice forms early in the season in the Straits and attains an average thickness of 17 inches and an average maximum thickness of 25 inches. The solid ice thickness remains about the same throughout the season. The prevailing W winds cause considerable ridging and 4- to 6-foot windrows are common. Some ice ridges as much as 30 feet deep have been reported.

Ice normally begins to form in harbors and shallow-water areas in early December with ice fields and concentrated brash forming in early January. The first ice barrier across the Straits usually forms between Waugoshance Point and St. Helena Island.

As ice forms in South Channel and between St. Ignace and Mackinac Island, these waters are closed to navigation to allow the formation of ice bridges. Mariners are notified of the closure by Broadcast Notice to Mariners.

Prevailing W winds cause ice conditions at the Lake Michigan end of the Straits of Mackinac to be more difficult than at the Lake Huron end. From the Mackinac Bridge to Lansing Shoals, the Straits are normally frozen over with solid plate ice by mid-January. Heavy accumulations and ridging occur in the vicinity of St. Helena Island, White Shoal, and the reefs along the Upper Peninsula of Michigan. To avoid danger to vessels, Grays Reef Passage may be closed to navigation; mariners will be informed of any closure by Broadcast Notice to Mariners.

As deterioration begins in March or April, stable fast ice becomes drift ice moving with winds and currents. Tracks cut by icebreakers become unreliable as the ice field deteriorates and shifts. Thick shore ice may drift into otherwise open channels and endanger even ice-reinforced vessels. A vessel which becomes beset in drift ice is vulnerable to grounding because of the many shoals, reefs and shallow-water areas in the Straits of Mackinac.

Wind-driven currents in the western Straits run eastward. Vessels beset in ice southeast of St. Helena Island have become endangered by drifting toward McGulpin Point or the Mackinac Bridge pilings.

The brash and drift ice between Mackinaw City, St. Ignace and Round Island remains east of the Mackinac Bridge, trapped by the ice in South Channel. The NNW winds will flush this ice out into Lake Huron when the ice in South Channel begins to break up.

Coast Guard icebreakers assigned to the Straits of Mackinac are based in St. Ignace and Cheboygan. Their services can be requested through Commander, Coast Guard Group Sault Ste. Marie; VHF-FM channels 16 (156.80 MHz). (See Winter Navigation, chapter 3.)

Routes.–The Lake Carriers' Association and the Dominion Marine Association have prescribed, for vessels enrolled in the associations, the following separation of routes for upbound and downbound traffic in Lake Huron:

Downbound vessels shall lay a course from De Tour Passage to pass not less than 15 miles NE from Middle Island Light, thence not less than 12 miles NE of Harbor Beach Light, and thence for the N entrance of Lake Huron Cut.

Downbound vessels from the Straits of Mackinac shall lay a course 070° for 6 miles from a point S of Poe Reef, then shall lay their course to join the regular downbound course from De Tour Passage at a point not less than 15 miles NE of Middle Island Light.

Downbound vessels from Calcite from a point abreast of Adams Point Lighted Buoy 1 shall lay a course about 100° to intersect the W limit of the general downbound course at a point about 15 miles NE of Middle Island Light.

Downbound vessels from Stoneport Harbor shall lay a course of about 098° to intersect the W limit of the general downbound course on Lake Huron at a point about 14 miles 071° from Middle Island Light.

Downbound vessels from Alpena shall head 159°, on Harbor Beach Light, to a point 12 miles above Pointe aux Barques Light, thence haul about SE to cross upbound traffic and reach the outside lane.

Downbound vessels from De Tour Passage to Cove Island from a position abreast of De Tour Light shall lay a course 137° for 12 miles, then 123° for 37 miles to a position 10 miles 213° from Great Duck Island Light, thence 102¾° for 61.25 miles to a position with Cove Island Lighted Bell Buoy T abeam.

Downbound vessels from Cove Island to the N entrance of Lake Huron Cut from a position abreast of Cove Island Lighted Bell Buoy T, shall lay a course 225° for 7 miles, thence 188¾° for 151 miles to the N entrance of Lake Huron Cut.

Upbound vessels on Lake Huron shall lay a course to pass not over 5 miles 067° off Harbor Beach Light and not over 7 miles 071° off Middle Island Light.

Upbound vessels on Lake Huron bound for Straits of Mackinac shall lay a course for Poe Reef Passage from a point not over 5 miles 050° from Presque Isle Light to abreast of Cordwood Point Lighted Buoy 1.

Eastbound vessels from Round Island Passage shall lay a course 090° to a point about 4.75 miles off Martin Reef; thence to a point 0.75 mile SE of De Tour Light.

Upbound vessels from the N entrance of Lake Huron Cut to Cove Island Lighted Bell Buoy T, from a position abreast of the N entrance of Lake Huron Cut, shall lay a course 036½° for 15 miles, thence 007¾° for 143.5 miles to Cove Island Lighted Bell Buoy T.

Caution.–A wreck covered 29 feet is W of the track line about 10.5 miles 018° from Fort Gratiot Light in about 43°09.2'N., 82°21.5'W.

Upbound vessels from Cove Island to De Tour Passage, from a position abreast of O'Brien Patch Lighted Bell Buoy TC, shall lay a course 284° for 61.5 miles to a position 6 miles 194° from Great Duck Island Light, thence 300° for 48 miles to a position 3 miles 137° from De Tour Light, thence to De Tour Light.

It is understood that masters may exercise discretion in departing from these courses when ice and weather conditions are such as to warrant it. The recommended courses are shown on chart 14860, Lake Huron.

It is recommended that the following limit of anchorage be observed in Lake Huron off De Tour Light so that vessels may enter or leave De Tour Passage in time of congestion due to fog or other conditions: No vessel to anchor E of a bearing on De Tour Light of 340°, or closer than 0.75 mile to the light or N of the De Tour Martin Reef course.

Pilotage.–The waters of Lake Huron in the approach to St. Clair River S of 43°05'30"N. are Great Lakes designated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. The remaining waters of Lake Huron are Great Lakes undesignated waters; the above vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great Lakes undesignated waters. Registered pilots for St. Clair River are supplied by Lakes Pilots Association, and for Lake Huron by Upper Great Lakes Pilots, Inc. (See appendix for addresses.) Pilot exchange points are off Port Huron at the head of St. Clair River in about 43°05'30"N., 82°24'42"W. and at De Tour, Mich., at the entrance to St. Marys River. Three pilot boats are at Port Huron; HURON BELLE has an international orange hull with an aluminum cabin, and HURON MAID and HURON LADY each have an international orange hull with a white cabin. The pilot boat at De Tour, LINDA JEAN, has a green hull and a white cabin. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

Principal ports.–The principal ports on Lake Huron are Bay City and Saginaw in the Saginaw River and Cheboygan. Private docks for deep-draft vessels are also at Alabaster, Port Gypsum, Alpena, Rockport, Stoneport, Calcite, and Port Dolomite.

Charts 14862, 14865.–The S end of Lake Huron in the approach to the head of the St. Clair River is obstructed by an extensive shoal area. A dredged channel, maintained at the Federal project depth of 30 feet, leads S for about 6 miles through the shoals to the head of the river. The channel is marked by lighted buoys and a **180°20'** lighted range at Point Edward, Ont. A radar transponder beacon (Racon) is at the front light. (See Canadian Light List for details.) Lake Huron Cut Lighted Buoy 12, marking the entrance to the channel from Lake Huron, is equipped with a radar transponder beacon (Racon). (See Racons, chapter 1, for additional information.)

Fort Gratiot Light (43°00.4'N., 82°25.3'W.), 82 feet above the water, is shown from a white conical tower on the W side of the head of St. Clair River. A radiobeacon is near the light. Port Huron Coast Guard Station is close S of the light.

Dredging spoils are adjacent to both sides of the dredged channel. On the E side of the channel, the spoil bank extends about 4 miles N from Point Edward and is about 1 mile wide with depths of 6 to 12 feet. A wreck, covered 15 feet, is E of the channel 3.4 miles NE of Fort Gratiot Light. On the W side of the channel, the spoil bank has depths of 9 to 15 feet for 4.5 miles N of Fort Gratiot Light, thence 16 to 24 feet for another 1.5 miles N.

Black River Canal, entered about 1.4 miles NNW of Fort Gratiot Light, extends SW for about 1.1 miles to its junction with the Black River.

From the head of the St. Clair River NNW for 19 miles to Lexington, the shore is low. In this stretch, the lake bottom is generally rocky with depths to 18 feet extending 1.3 miles offshore. A shoal with a least depth of 12 feet is 0.9 mile NE of the mouth of **Burtch Creek,** 7 miles S of Lexington. A 16-foot diameter potable water intake extends from shore 5.7 miles NNW of Fort Gratiot Light NE for 5 miles to a crib covered 40 feet. A wreck, covered 29 feet, is 10.7 miles NNE of Fort Gratiot Light.

Chart 14862.–Lexington, Mich., is an artificial harbor 19 miles NNW of the head of St. Clair River. An elevated silver water tank in Lexington is prominent from lakeward.

Channels.–A dredged entrance channel leads N from deep water in Lake Huron to a harbor basin formed by two breakwaters. The harbor entrance is marked by buoys and by lights on the outer ends of the breakwaters. In 1985, the controlling depths were 6½ feet (7½ feet at midchannel) in the entrance channel and 5 to 7 feet in the basin except for shoaling to bare along the E side.

A wreck, covered 13 feet, is 0.6 mile ESE of the harbor entrance.

Small-craft facilities.–A marina developed by the Michigan State Waterways Commission is in the harbor basin. Transient berths, gasoline, diesel fuel, electricity, water, and sewage pump-out facilities are available.

The shore from Lexington N for 11 miles to Port Sanilac consists of low bluffs. The 18-foot contour is about 0.6 mile offshore, and there are numerous submerged rocks as much as 0.5 mile offshore in this stretch. The most dangerous is a group of rocks that uncover during low water conditions about 5 miles N of Lexington.

Port Sanilac, Mich., an artificial harbor used by pleasure craft, is on the W shore of Lake Huron about 30 miles N of the head of St. Clair River. An elevated blue tank just N of the harbor is prominent from lakeward.

Port Sanilac Light (43°25.8′N., 82°32.4′W.), 69 feet above the water, is shown from a white octagonal tower in the village, SW of the harbor basin.

Channels.–A dredged entrance channel extends N from deep water in Lake Huron on the W side of an extension of the N breakwater which protects the harbor entrance. The channel turns W between the N breakwater and a detached S breakwater into the harbor basin. The outer ends of the breakwaters are marked by lights. In May 1985, the controlling depths were 7 feet in the entrance channel, thence 8 to 10 feet in the N section of the anchorage basin except for shoaling along the NW edge, thence 3½ to 6 feet in the S section except for shoaling along the S edge.

Small-craft facilities.–Transient berths, gasoline, diesel fuel, water, electricity, haul-out facilities, sewage pump-out facilities, and harbormaster services are available at the public dock on the W side of the harbor basin.

A marina just SW of the public dock provides gasoline, water, ice, electricity, marine supplies, a launching ramp, a 20-ton hoist, and hull, engine, and electronic repairs.

Storm warning signals are displayed at the inner end of the public dock. (See chart.)

From Port Sanilac the shore continues bluff and rocky for 29 miles N to Harbor Beach. The 18-foot contour is no more than 1 mile offshore, but numerous rocks, bare and submerged, present a hazard to small craft navigating this stretch. The most dangerous are a rock that bares about 0.3 mile offshore 1 mile N of Port Sanilac and a group of rocks, covered 3 to 6 feet, 0.5 mile offshore 11.5 miles N of Port Sanilac.

Forester, Mich., 5 miles N of Port Sanilac, can be identified by two church spires close to shore. There are no docks; shoals, rocks, and dock ruins render navigation hazardous. Landing should not be attempted without local knowledge.

Forestville, Mich., about 16 miles N of Port Sanilac, can be identified by the spire of a small white church. A rock jetty with a launching ramp on its N side extends about 200 feet from shore at the village. There is excellent holding ground SE of the jetty in 30 feet.

From Forestville N to Harbor Beach numerous submerged rocks extend as much as 0.7 mile offshore.

Harbor Beach, Mich., is an artificial harbor about 60 miles N of the head of the St. Clair River. It is an important harbor of refuge for large vessels on the W shore of Lake Huron. A 300-foot stack at the powerplant in the N part of the harbor is prominent.

Harbor Beach Light (43°50.7′N., 82°37.9′W.), 54 feet above the water, is shown from a white conical tower on the N side of the harbor entrance. A fog signal and radiobeacon are at the light.

Channels.–A dredged entrance channel leads W from deep water in Lake Huron between detached breakwaters to a dredged anchorage basin inside the N breakwater. Lights mark the ends of the breakwaters at the harbor entrance, and buoys mark the SW and NW limits of the basin. In May 1985, the controlling depth was 20 feet in the entrance channel with 7 to 21 feet available in the basin decreasing to 6 feet along the NW side of the basin.

Small craft can enter the harbor through a gap in the N breakwater. In 1966, the controlling depth in the gap was 7 feet in the E half and 5 feet in the W half. Small craft with local knowledge can enter the harbor at the S end; a depth of about 3 feet can be carried, taking care to avoid shoals and a wreck covered 1 foot off the S end of the S breakwater.

Dangers.–Two wrecks in the harbor, covered 6 feet and 3 feet, are about 0.6 mile WNW and WSW of Harbor Beach Light, respectively.

Harbor Beach Coast Guard Station, seasonal, is at the outer end of a causeway and trestle extending E from shore about 0.7 mile WNW of Harbor Beach Light.

Harbor Regulations.–(See **33 CFR 207.480,** chapter 2, for harbor regulations.)

Wharves.–The Hercules, Inc. coal dock is opposite the main harbor entrance. In 1977, the reported controlling depths were 9½ feet along the 165-foot

SE face of the dock with 8 feet along the 230-foot N and S faces. There is storage for 30,000 tons of coal.

The Detroit Edison Co. Harbor Beach Power Plant Wharf is on the W side of the harbor just N of the Coast Guard Station. The wharf has 700 feet of berthing space with dolphins, and reported depths of 15 feet alongside. There is storage for 150,000 tons of coal.

No services, other than dockage along the breakwater, are available to large vessels in Harbor Beach.

Small-craft facilities.–An 850-foot public dock WSW of the harbor entrance is in reasonably good condition and has a launching ramp on its N side. A marina just S of the Coast Guard causeway provides gasoline, diesel fuel, water, electricity, marine supplies, a launching ramp, and outboard motor repairs. In 1977, the reported controlling depth was 4 feet in the approach channel with 2½ feet alongside the docks. The channel is marked by private buoys.

A marina, under construction in 1985, is at the N end of the N breakwater. In 1985, the controlling depth was 2 feet in the entrance, thence 2 feet in the basin with 1½ feet along the N edge.

There is a hospital in Harbor Beach.

From Harbor Beach NNW for 15 miles to Pointe aux Barques Light, the shore is low and wooded with bluffs from close up to 1 mile from shore. An extensive flat with rock ledges and detached bare and submerged rocks extends as much as 1.5 miles offshore. Off **Forest Bay,** from 2 to 3 miles N of Harbor Beach, several dangerous ledges with depths of 2 to 10 feet extend N and S, 1 to 1.5 miles offshore.

Port Hope, Mich., a small village about 7 miles N of Harbor Beach, has a dock in very poor condition and a small basin formed by breakwalls. The approach and the basin have less than 2 feet of water. A marina, with 1 foot reported alongside in 1977, is just S of the basin and provides water. Port Hope Chimney, a freestanding stone and brick stack on the beach, is a State monument. This stack and the spire in the village are prominent. Good holding ground is found E and N of Port Hope, in depths of 35 to 40 feet.

Pointe aux Barques Light (44°01.4'N., 82°47.6'W.), 93 feet above the water, is shown from a white conical tower with an attached dwelling on a point 15 miles NNW of Harbor Beach.

A dangerous reef, with rocks covered less than 6 feet near its outer edge, extends 2 miles E from Pointe aux Barques Light. A 5-foot spot is 1.2 miles NE of the light, and boulders, covered 13 to 15 feet, extend up to 2.5 miles N and NE from the light. A lighted buoy marks the extent of the reefs NE of the light.

Chart 14863.–From Pointe aux Barques Light to **Pointe aux Barques** (44°04.1'N., 82°57.9'W.), 9 miles NW, the shore continues low and wooded. Ledges and detached rocky spots render the stretch dangerous within 3 miles of shore. **Orion Rock,** covered 3 feet, is about 0.8 mile offshore 3 miles NW of Pointe aux Barques Light.

Grindstone City, Mich., a small settlement 5.5 miles NW of Pointe aux Barques Light, has a small-craft harbor formed by two jetties. A privately dredged channel, marked by private buoys, leads along the NW side of the SE jetty, thence angles W between projections on the inner sides of the jetties to a harbor basin. In 1977, the reported controlling depth was 4 feet in the approach, entrance channel, and basin. However, it was reported that sudden atmospheric pressure or wind changes may change the water level in the harbor by as much as 1 foot. The harbor should not be entered without local knowledge. Gasoline is available in the harbor.

In June 1983, a sunken wreck was reported about 1.2 miles E of the harbor in about 44°03'24"N., 82°51'50"W.

At **Burnt Cabin Point,** 2 miles E of Pointe aux Barques, a rocky ledge extends off about 0.8 mile around the point. **Alaska Bay,** a small bight between Burnt Cabin Point and Pointe aux Barques, has good water to within about 0.4 mile of its head. **Port Austin Reef** is a dangerous reef extending 1.7 miles NW from Pointe aux Barques. **Port Austin Reef Light** is near the outer edge of the reef. The light should not be passed close aboard even by vessels of shallow draft because of riprap and other obstructions that extend out 900 feet from the base. A detached 11-foot shoal, marked on the N side by a buoy, is 0.9 mile NNW of the light. Vessels should not pass inside the buoy.

From Pointe aux Barques the shore extends SW to Port Austin with rocky flats extending about 0.5 mile offshore.

Port Austin, Mich., is a village and small-craft harbor at the mouth of **Bird Creek** about 2 miles SW of Pointe aux Barques on the shore of a shallow bay between that point and **Flat Rock Point** (44°02.7'N., 83°01.6'W.). A church spire just E of town and a radio mast on high ground 1.5 miles S of the harbor are prominent.

Channels.–A dredged entrance channel leads S from deep water in Lake Huron to a harbor basin protected by a detached breakwater on the W and NW sides. The outer end of the breakwater is marked by a light. In May 1984, the controlling depth was 11 feet in the entrance channel with 5½ to 10 feet in the basin except for shoaling to 1½ feet in the S end.

The entrance should be approached from the N or NW to avoid the reef area NE of the harbor. A buoy 0.4 mile N of the breakwater light marks the NW extent of the reef. Buoys mark the E and SE limits of the dredged basin. The area around the shoreward end of the breakwater is extremely shoal with numerous rocks and gravel bars above and below the water surface. The harbor affords limited protection from all winds.

Bird Creek enters the harbor at the S end of the basin. The W side of the mouth of the creek is protected by a pier that extends about 450 feet N. The creek is entered by holding close to the pier, because of shoaling on the E side of the mouth. In 1979, the W side of the mouth was reported dredged to 4 feet. In 1977, it was reported that local interests had dredged the creek to 6 feet for about 0.2 mile above the mouth.

W of the creek mouth, the Michigan State Waterways Commission has dredged a basin and provided docking facilities for small craft. The basin has been dredged to 6 feet, mostly from solid rock, leaving a hazardous abrupt shoal border along its limits. The W and S limits of the basin are marked by private buoys.

Small-craft facilities.–Gasoline, berths, water, electricity, and sewage pump-out facilities are available at the State pier in the harbor basin. Marinas in Bird Creek also provide diesel fuel, marine supplies, and launching ramps. A 15-ton hoist can handle 43-foot vessels for hull, engine, and electrical repairs.

Saginaw Bay, the largest indentation on the W side of Lake Huron, is 26 miles wide at its entrance between Pointe aux Barques to SE and **Au Sable Point** (44°20.0'N., 83°20.4'W.) to NW. The bay extends about 52 miles SW to its head at the mouth of the Saginaw River. At about its midpoint, the bay is constricted to a width of about 13 miles between Sand Point (43°54.8'N., 83°24.0'W.) to SE and Point Lookout (44°03.0'N., 83°34.8'W.) to NW.

The mouth of the bay is wide and open with good depths, but the deepwater channel leading to the upper part of the bay is restricted to a width of about 1.8 miles between a shoal that extends SE from Point Lookout and a very shallow bank that extends as much as 14 miles from the E shore of the bay. S of Point Lookout, the bay widens to as much as 22 miles. A deepwater channel up to 7 miles wide, with depths of 24 feet or more, extends to within 8 miles of the head of the bay. A dredged channel extends through the shallower water at the head of the bay to the mouth of the Saginaw River.

Fluctuations of water level.–The water level in Saginaw Bay is subject to sudden changes due to the wind. A NE gale driving water into the bay can raise the level at the mouth of Saginaw River 3 to 4 feet, sometimes in less than as many hours, while a SW wind sometimes lowers the level sufficiently to cause large vessels to ground in the channel.

Caution.–The course across the mouth of Saginaw Bay is dangerous in heavy weather. Tawas Bay, on the W side of the mouth, has good anchorage with protection from all but SW winds.

Numerous charted and uncharted fish net stakes and structures, some submerged, are in Saginaw Bay.

From Port Austin, the E shore of Saginaw Bay trends generally SW for 22 miles to **Sand Point.** From **Flat Rock Point,** 1.5 miles W of Port Austin, the shore consists of low bluffs for 3 miles SSW to the mouth of **Pinnebog River,** thence 3 miles W to **Hat Point.** The bluffs become wooded from Hat Point W for about 8 miles to **Oak Point** (43°58.5'N., 83°15.7'W.). At Oak Point the shore turns SW for 2 miles to Caseville Harbor, thence SW and W for 7 miles to the extremity of Sand Point.

Between Flat Rock Point and Oak Point, shoals extend as much as 5 miles N from the shoreline. **Flat Rock Point Reef,** with a least depth of 2 feet, is W of Flat Rock Point with its S end about 1.7 miles NW of the mouth of Pinnebog River and thence extending 1 mile N. **Hat Point Reef,** with a least depth of 2 feet near its outer end, extends 2 miles N from shore, just E of Hat Point. Detached 20- and 21-foot spots are 4 miles N and 5.2 miles NW of Hat Point, respectively. Midway between Hat Point and Oak Point, depths of 7 feet and 1 foot are 1.5 and 0.9 miles offshore, respectively. A detached 12-foot spot is 2 miles NW of Oak Point.

From Sand Point, a shoal bank extends about 13 miles NW. **Little Charity Island** and **Charity Island** are on the bank about 7 and 8 miles NW of Sand Point, respectively. Between the point and the islands, the bottom is generally sandy with scattered boulders. Depths of 7 feet are available across the shoal, but the prevailing depths are less. Charity Island, low and wooded, is marked at the NW end by an abandoned lighthouse. From the island, the shoal bank extends about 3½ miles W and 4 miles N. Numerous spots with depths of 13 to 20 feet are from 3 to 5 miles NE of the island. **Charity Island Shoal Lighted Bell Buoy 5,** about 5.5 miles NW of Charity Island, marks the NW extent of the shoal bank.

Entering Saginaw Bay, a course S from the lighted bell buoy leads 6.5 miles through deep water to abreast Gravelly Shoal Light, which marks the shoals off Point Lookout at the narrowest point of the deepwater channel into the bay. A 17-foot spot, marked on the W side by a lighted buoy, is 3.6 miles WNW of Charity Island and close E of the course between Charity Island Shoal Lighted Bell Buoy 5 and Gravelly Shoal Light.

Caseville Harbor, Mich., is at the mouth of the **Pigeon River,** about 18 miles SW of Pointe aux Barques and 6.5 miles ENE of Sand Point. A white spire in the town is prominent.

Channels.–A dredged entrance channel leads from deep water in Saginaw Bay to the mouth of Pigeon River and thence upstream for 0.3 mile. A breakwater extends bayward from the mouth of the river on the N side of the entrance channel. The outer end of the breakwater is marked by a light and the channel is marked by buoys and a private **113°30'** lighted range. In February 1984, the controlling depth was 8 feet in the approach channel, and thence 6 feet in the left outside quarter in the entrance channel to the upstream limit of the Federal project.

A **slow-no wake speed** is enforced in the harbor.

Small-craft facilities.–A public dock, constructed by the Michigan State Waterways Commission, and a marina provide berths, gasoline, water, ice, electricity, sewage pump-out, marine supplies, launching ramps, and a boat hoist.

Sand Point (43°54.8'N., 83°24.0'W.) is a narrow point extending 4 miles W from about midpoint of the E shore of Saginaw Bay. Canals and approach channels have been privately dredged at the W end and along the S side of the point. Dockage for small craft is available in the canals, but the channels are subject to shoaling and caution is advised.

From Sand Point SW for 28 miles to the mouth of the Quanicassee River, the southernmost point of Saginaw Bay, the shore is generally low and marshy. The shore then trends NW for 10 miles to the mouth of the Saginaw River. Above Sand Point, the E side of the bay is a sandy flat extending 8 to 10 miles offshore within the 18-foot contour. The bottom is irregular, with depths less than 10 feet scattered over the entire area.

Wild Fowl Bay is enclosed by Sand Point on the N and by **North Island,** 2.3 miles SW of Sand Point, and **Wild Fowl Point** on the S. The bay has central depths of 6 feet or more, with much lesser depths toward shore.

On the SE side of Wild Fowl Bay, a channel locally known as Wallace Stone Cut leads to a marina basin. The entrance is marked by a private lighted range. In 1977, the entrance channel had a reported controlling depth of 5 feet with 4 to 10 feet in the basin. The marina provides gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 20-ton hoist can handle 38-foot boats for hull and engine repairs.

Bay Port Harbor, Mich., is on the S shore of Wild Fowl Bay just E of Wild Fowl Point and about 25 miles SW of Pointe aux Barques. Commercial fishermen use the harbor.

Channels.–A dredged entrance channel leads S from deep water in Wild Fowl Bay to join privately maintained channels. In March 1980, the controlling depth was 2½ feet in the entrance channel.

From Wild Fowl Point SW for 11.5 miles to **Fish Point** (43°43.1'N., 83°31.5'W.), a shoal bank with depths less than 6 feet extends about 3.5 miles offshore. This bank has numerous islands, the largest of which are **Heisterman Island,** 1 mile S of North Island, and **Middle Grounds Island** and **Maisou Island,** just S of Heisterman Island.

Sebewaing Harbor is at the mouth of the Sebewaing River, on the E shore of Saginaw Bay about 12 miles S of Sand Point. Two stacks on the N side of the river in the village of **Sebewaing, Mich.,** are prominent.

Channels.–A dredged entrance channel, marked by buoys, leads SE from deep water in Saginaw Bay through the mouth of the Sebewaing River and upstream to about 800 feet below the Chesapeake and Ohio Railroad bridge. Above this point a channel dredged for flood control purposes extends upstream for about another 1.3 miles to the junction of the Columbia and State Drains.

In January-February 1984, the controlling depth was 1½ feet in the north half of the entrance channel thence shoaling to bare in the flood control project.

Bridge.–A fixed railroad bridge with a clearance of 12 feet crosses the river at the village.

A **slow-no wake speed** is enforced on the Sebewaing River and connecting channels and canals.

From Fish Point SW to the Quanicassee River, depths less than 6 feet extend about 1 mile offshore. A marina about 8.5 miles SW of Sebewaing provides gasoline, diesel fuel, ice, electricity, sewage pump-out, and a launching ramp. A 20-ton hoist is available for minor engine repairs.

Quanicassee River, flowing into the SE corner of Saginaw Bay, is practically closed by the bars at its mouth. Depths less than 6 feet extend 2 miles off the mouth. W of the river mouth, the 6-foot contour extends 5 miles offshore and then narrows to about 1 mile at the mouth of Saginaw River. The entrance to Quanicassee River is marked by private seasonal buoys.

Charts 14863, 14867.–The **Saginaw River** is formed by the confluence of the Tittabawassee and Shiawassee Rivers at **Green Point** (43°23.1'N., 83°58.2'W.) at the S limit of the city of Saginaw. The river flows N for 22 miles and empties into the head of Saginaw Bay. The lower 18 miles of the river form a commercial harbor. Grain, chemicals, petroleum products, limestone, coal, sand, gravel, and cement are the major commodities handled at the ports of **Bay City, Mich.,** just above the river mouth, and **Saginaw, Mich.,** 19 miles above the river mouth. Other towns on the river are **Essexville, Mich.,** on the E side just above the mouth, and **Zilwaukee, Mich.,** and **Carrollton, Mich.,** on the W side just below Saginaw.

Prominent features.–Two 500-foot stacks at the powerplants on the E side of the river mouth and a TV mast at Essexville are prominent.

Channels.–A Federal project provides for a dredged entrance channel leading SW from the deep water in Saginaw Bay for about 13.5 miles to the mouth of the Saginaw River and thence upstream for about 20 miles to the ports of Bay City and Saginaw. The entrance and river channels are well marked by lighted and unlighted buoys. A **211°20'** lighted range marks the entrance channel, and a **160°** lighted range marks a reach in the lower part of the river.

The Federal project depths are 27 feet in the entrance channel to the mouth of the river, thence 26 feet through the mouth, thence 25 feet to the Grand Trunk Western Railroad bridge at Bay City, thence 22 feet to the Chesapeake and Ohio Railway bridge in Saginaw, thence 16½ feet to the Holland Avenue bridge in Saginaw. Five turning basins in the river have project depths as follows: 25 feet at Essexville, 22 feet in Bay City opposite the airport, 20 feet at Carrollton, 20 feet just below the Chesapeake and Ohio Railway bridge at Sixth Street in Saginaw, 15 feet between the Grand Trunk Western Railroad bridge and the Holland Avenue bridge at Carroll Street in Saginaw. (See Notice to Mariners and latest editions of charts for controlling depths.)

In August 1985, a submerged obstruction was reported to be 25 yards W of Saginaw Bay Channel Lighted Buoy 27. In 1981, a submerged obstruction was reported on the W side of the channel between Saginaw Bay Channel Range Front Light and Saginaw Bay Channel Lighted Buoy 34; caution is advised.

Above the Holland Avenue bridge in Saginaw depths in the river vary from 7 to 15 feet for about 2.8 miles to Green Point.

In 1977, it was reported that the **Tittabawassee River** was navigable by small boats for only about 1.5 miles above Green Point. Above that point stumps, sunken logs, and snags severely obstruct the river.

The **Shiawassee River,** near Green Point, has an available depth of 5 to 6 feet, and the crooked channel across Shiawassee Flats is 15 or 16 feet deep in many places. In 1977, numerous submerged pilings were reported at the mouth of the river in the vicinity of Green Point. Above the flats, the Shiawassee River is very narrow and crooked, but is navigable for small boats to the junction with **Bad River,** and thence the Bad River to the village of St. Charles, 13 miles from Green Point. A highway bridge with a 19-foot fixed span and a clearance of 8½ feet crosses Shiawassee River about 6.7 miles above the mouth.

The **Cass River** and **Flint River,** tributaries of the Shiawassee, are navigable by rowboats to a limited extent, being greatly obstructed by sunken logs and snags.

An irregularly shaped diked disposal area is on the E side of the entrance channel to the Saginaw River about 1 mile NE of the mouth.

The former dredged approach to the Saginaw River leads N from the mouth to deep water in Saginaw Bay. The channel, with a least depth of about 13 feet, is unmarked and no longer maintained.

Fluctuations of water level.–Each year the normal variation in level between the highest and lowest mean monthly stages in the Saginaw River is about 3 feet. In addition, spring floods and excessive rains may cause an abnormal rise of as much as 14 feet in the river at Saginaw. Occasionally a considerable change takes place within a few hours, resulting from the raising or lowering of Saginaw Bay by violent NE or SW winds.

Towage.–A 1,700-hp tug is available at Bay City. Arrangements are made through American Tug and Transit Co. at 517-684-1183. The tug provides service in the Saginaw River. The tug's VHF-FM channels include 16 (156.80 MHz), 6 (156.30 MHz), 10 (156.50 MHz), 12 (156.60 MHz), and 22 (157.10 MHz). At least 6 hours advance notice is requested. Vessels are usually met at the mouth of the river. The tug does not usually operate in fog or under adverse current and wind conditions.

A 4,000-hp tug, GREGORY J. BUSCH, is also available at Bay City. Arrangements are made through Busch Marine Services, at 517-792-2063, or by contacting the tug on VHF-FM channel 16. Working channels include 16, 6, 10, 12, 13 (156.65 MHz), 21 (157.05 MHz), and 22. Two hours advance notice is requested; however, the tug is manned 24 hours a day. The tug operates on all lakes and meets vessels at any location including midlake. The tug is equipped with radar and loran and operates under any conditions. Open water rescue towing between Port Huron and De Tour Passage is available, and the tug has ice breaking capabilities.

Saginaw-Bay City is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Saginaw River Coast Guard Station is on the E side of the river about 1.7 miles above the mouth.

Wharves.–The Saginaw River has numerous facilities along both sides for 18 miles above the mouth. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 45, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operator.) All the facilities described have highway connections, and many have railway connections. Some of the facilities have water and electrical shore-power connections.

Facilities on the E side of the river at Essexville and Bay City:

Consumers Power Co. Dock: E side of river mouth; 2,664-foot face; 18 feet alongside; deck height, 7 feet; open storage for 350,000 tons of coal; receipt of coal; owned and operated by Consumers Power Co.

Aetna Cement Corp. Wharf: 2 miles above the river mouth; 850 feet of berthing space; 22 to 25 feet alongside; deck height, 7 feet; open storage for 225,000 tons of limestone and 30,000 tons of cement clinker; silo storage for 75,000 tons of cement; receipt of limestone and cement clinker; owned and operated by Aetna Cement Corp.

Carrollton Concrete Mix Corp., Essexville Dock: just above Aetna Cement Corp. Wharf; 800-foot face; 18 to 20 feet alongside; deck height, 3 feet; 6 acres open storage; receipt of limestone; owned and operated by Carrollton Concrete Mix Corp.

Sand and Stone Dock: 0.5 mile above Aetna Cement Corp. Wharf; 1,400-foot face; 6 to 25 feet alongside; deck height, 3 feet; about 15 acres open storage for limestone; receipt of limestone; owned and operated by Sand and Stone, Inc.

Wirt Agricultural Products Dock: 0.2 mile below Detroit and Mackinac Railway bridge; 560 feet of berthing space with breasting dolphins; 25 feet alongside; deck height, 7 feet; covered storage for 11,000 tons of beet pulp pellets; shipment of beet pulp pellets and other agricultural products; owned and operated by Wirt Overseas Blending and Transfer Co.

Enterprise Oil and Gas Co. Wharf: 0.15 mile below Detroit and Mackinac Railway bridge; 170 feet of berthing space with dolphins; 27 feet alongside; deck height, 7 feet; tank storage for 183,000 barrels; receipt of petroleum products; owned and operated by Enterprise Oil and Gas Co.

Bay Aggregate Dock: 0.2 mile above Veterans Memorial Bridge; 560-foot face; 15 to 20 feet alongside; deck height, 6 feet; open storage for 35,000 tons of stone and 25,000 tons of sand; receipt of stone; owned and operated by Bay Aggregate, Inc.

Structures across the Saginaw River and Tributary

**Miles above Saginaw Bay Channel Range Front Light*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	Main Channel							
1	Overhead cable	Power	0.55				181	
2	Overhead cable	Power	0.93				125	
3	Detroit and Mackinac Ry. bridge	Railroad	3.10	96	94		7	Swing. Notes 1 and 2.
4	Independence Bridge	Highway	3.88			150	22	Bascule. 30 feet at center. Note 1.
5	Grand Trunk Western RR bridge	Railroad	4.94	101	101		8	Swing. Notes 1 and 2.
6	Woodside-Vermont Streets Bridge	Highway	4.99			150	23	
7	Veterans Memorial Bridge	Highway	5.60			146	15	Bascule. 23 feet at center. Note 1.
8	Overhead cable	Power	5.79				135	
	Junction with West Channel		6.40					
9	Lafayette St. bridge	Highway	6.78			150	20	Bascule. Note 1.
10	Cass Ave. bridge	Highway	7.78					Bridge removed. Piers remain.
11	Overhead cable	Power	10.02				143	
12	Overhead cable	Power	12.97				142	
13	Overhead cable	Power	14.40				138	
14	Overhead cable	Power	14.52				136	
14A	Bridge	Highway	14.61			300	121	Fixed. Under construction in November 1982. Will replace I-75 bridge.
15	Route I-75 bridge	Highway	14.64			150	30	Bascule. Note 1.
16	Overhead cable	Power	14.77				130	
17	Sixth St. bridge	Highway	17.00	72	72		12	Swing. Note 1.
18	Chesapeake & Ohio Ry. bridge	Railroad	18.00			150	13	Bascule. Notes 1 and 4.
19	Overhead cable	Power	18.03				124	
20	Route I-675 bridge	Highway	18.38			138	34	Fixed.
21	Johnson St. bridge	Highway	18.52			100	25	Fixed.
22	Genesee Ave. bridge	Highway	18.65			88	25	Fixed.
23	Grand Trunk Western RR bridge	Railroad	19.16	70	70		12	Swing. Note 3.
24	Overhead cables	Power	19.65				135	
25	Holland Ave. bridge	Highway	19.67			113	20	Fixed.
26	Court St. bridge	Highway	20.34			107	32	Fixed.
27	Rust Ave. bridge	Highway	20.74	66	66		18	Fixed.
28	Overhead cables	Power	21.28				52	
29	Douglas G. Schenck Bridge	Highway	21.34			116	19	Fixed.
30	Overhead cable		22.28				30	
31	Overhead cable	Power	22.36				56	
	Tittabawassee River							
32	Overhead cable	Power	23.10				52	
33	Overhead cable		23.14				30	
34	Consumers bridge	Highway				58	25	Fixed.

Structures across the Saginaw River and Tributary (Continued)

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	West Channel							
35	Overhead cable	Power	6.72				27	
36	Lafayette St. bridge	Highway	6.84			71	18	Fixed.
37	Overhead cable	Power	6.89				28	
38	Overhead cable	Power	7.26				32	
39	Overhead cable	Power	7.89				18	
40	Cass Ave. bridge	Highway	7.90					Bridge removed. Center pier remains.
41	Overhead cable	Power	7.91				18	

Note 1.–See **33 CFR 117.1 through 117.59 and 117.647**, chapter 2, for drawbridge regulations.

Note 2.–The bridge will not have a tender on duty and will be left in an open position from 0300 to 1100 Tuesday through Friday and from 0300 Saturday to 1100 Monday except for one special closing usually between 1200 and 1600. A bridgetender will be on duty at all other times and proper whistle signals should be sounded to have the bridge opened for passage.

Note 3.–Maintained in the closed position. See 33 CFR 117.700(j)(4), chapter 2, for drawbridge regulations.

Note 4.–To request opening contact Chesapeake & Ohio Chief Dispatcher (telephone: 517-753-0151), at least 3 hours in advance.

Rock Products Corp. Dock: about 0.6 mile above Veterans Memorial Bridge; 470-foot face; 12 to 15 feet alongside; deck height, 4 feet; open storage for 30,000 tons of stone; receipt of stone; owned and operated by Rock Products Corp.

Midland Contracting Co. Dock: about 0.3 mile below Lafayette Street bridge; 970-foot face; 12 feet alongside; deck height, 4 feet; open storage for 75,000 tons of stone; receipt of stone; owned and operated by Midland Contracting Co.

Saginaw Valley Marine Terminal Dock: about 1.1 miles above Lafayette Street bridge; about 550 feet of berthing space with dolphins; 23 feet alongside; deck height, 5 feet; 110,000 square feet covered storage; 4 acres open storage; receipt and shipment of general cargo; owned and operated by Saginaw Valley Marine Terminal and Warehouse Co. Inc.

Facilities on the W side of the river at Bay City:

Amoco Lake Terminal: N side of the slip about 2 miles above the river mouth; 392 feet of berthing space with piles; 18 feet alongside; deck height, 5 feet; pipelines to storage tanks, capacity 675,000 barrels; owned and operated by Amoco Amoco Oil Co.

Dow Chemical USA Lower Wharf: 400 feet below Detroit and Mackinac Railway bridge; offshore wharf, 350 feet of berthing space with dolphins; 25 feet alongside; deck height, 6 feet; pipelines extend to tank storage, capacity over 2 million barrels; shipment of petroleum products and petrochemical; owned and operated by Dow Chemical USA.

Total Petroleum Wharf: 0.35 mile above Detroit and Mackinac Railway bridge; offshore wharf, 120 feet of berthing space with dolphins; 23 feet alongside; deck height, 6 feet; pipelines extend to tank storage, capacity 430,000 barrels; receipt and shipment of petroleum products; owned and operated by Total Petroleum Inc.

Dow Chemical USA Upper Wharf: 0.2 mile below Independence Bridge; offshore wharf, 275 feet of berthing space with dolphins; 20 feet alongside; deck height, 5 feet; pipelines extend to tank storage, capacity 251,000 barrels; shipment of chemicals and petrochemicals; receipt of liquid fertilizer; owned by International Terminals, Inc, and operated by Dow Chemical USA.

Wirt Stone Co. Dock: immediately above Independence Bridge; 2,500-foot face; 15 feet alongside; deck height, 3 to 6 feet; open storage for 220,000 tons of material; receipt of stone, coal, and salt; owned and operated by Wirt Transport Co.

Fletcher Marine Terminal Dock: about 0.5 mile above Wirt Stone Co. Dock; offshore wharf, 220 feet of berthing space with dolphins; 25 feet alongside; deck height, 7 feet; pipeline extends to storage tank, capacity 8,000 tons; receipt of liquid fertilizer; owned and operated by Fletcher Oil Co., Inc.

Facilities on the E side of the river at Saginaw:

Saginaw Asphalt Paving Co., Buena Vista Dock: 0.25 mile above Route I–75 bridge; 1,050 feet of berthing space along dolphins; 20 feet alongside; deck height, 6 feet; 14 acres open storage; receipt of stone; owned and operated by Saginaw Asphalt Paving Co.

Wirt Saginaw Stone Dock: 0.5 mile above Route I–75 bridge; 1,800-foot face; 18 to 20 feet alongside; deck height, 4 feet; 28 acres open storage; receipt of stone, salt, and coal; owned by Alice Wirt and operated by Bay Dock Co., Inc.

General Motors Metal Castings Plants, Sand Dock: 0.3 mile below Sixth Street bridge; 1,500-foot face; 20 to 22 feet alongside; deck height, 2 to 4 feet; open storage for 70,000 tons of sand; receipt of sand; owned and operated by Central Foundry Division, General Motors Corp.

Saginaw Rock Products Co. Dock: 0.4 mile below Chesapeake and Ohio Railway bridge; 1,050 feet of berthing space; 10 to 22 feet alongside; deck height, 6 feet; open storage for 120,000 tons of material; receipt of stone and potash; owned and operated by Saginaw Rock Products Co.

Facilities on the W side of the river at Zilwaukee, Carrollton, and Saginaw:

Clawson Concrete Co. Dock: 1.1 miles below the Route I-75 bridge; 1,100-foot face; 20 to 23 feet alongside; deck height, 7 feet; 10 acres open storage; receipt of stone and potash; owned and operated by Clawson Concrete Co.

Consumers Powers Co., Zilwaukee Dock: 0.4 mile below Route I-75 bridge; 1,115-foot face; 20 feet alongside; deck height, 8 feet; receipt of construction materials; owned and operated by Consumers Power Co.

Michigan Elevator Exchange Wharf: 1.1 miles above Route I-75 bridge; 556 feet of berthing space with dolphins; 20 feet alongside; deck height, 6 feet; grain elevator, capacity over 2½ million bushels; grain gallery with three vessel-loading spouts, loading rate 30,000 bushels per hour; shipment of grain; owned and operated by Michigan Elevator Exchange Division of Farm Bureau Services, Inc.

Luntz Corp. Dock: 0.2 mile below Sixth Street bridge; 540-foot face; 19 feet alongside; deck height, 12 feet; cranes to 25 tons; open storage for 35,000 tons of material; receipt of potash and miscellaneous bulk materials; owned and operated by Luntz Corp.

Huron Cement, Sixth Street Dock: immediately below Sixth Street bridge; 545-foot face; 20 feet alongside; deck height, 10 feet; storage silos for 46,000 barrels of cement; receipt of bulk cement; owned and operated by Huron Cement Division of National Gypsum Co.

The Pillsbury Co., Carrollton Wharf: 0.2 mile above Sixth Street bridge; 550 feet of berthing space with dolphins; 20 feet alongside; deck height, 4 feet; 3-million-bushel grain elevator; vessel-loading spout; shipment of grain owned and operated by The Pillsbury Co., Edible Protein Division.

Saginaw Asphalt Paving Co., Carrollton Dock: 0.2 mile above Sixth Street bridge; 924 feet of berthing space; 20 feet alongside; deck heights, 6 and 11 feet; 10 acres open storage; receipt of stone; owned and operated by Saginaw Asphalt Paving Co.

Saginaw Core Sand Co. Dock: immediately below the Chesapeake and Ohio Railway bridge; 850 feet of berthing space; 10 to 20 feet alongside; deck height, 8 feet; open storage for 100,000 tons of stone; receipt of stone; owned and operated by Saginaw Core Sand Co.

Supplies.–Marine supplies and provisions are available at firms in Bay City and Saginaw. Bunker C and diesel oil are available at the Dow Chemical Refinery Wharf in Bay City. Water is available at some wharves.

Repairs.–Above-the-waterline repairs, some engine repairs, and a 100-ton marine railway are available at a marine contractor at the S end of Middle Ground, about 8 miles above the river mouth in Bay City.

Small-craft facilities.–Marinas are on the W side of the river 1.6 miles above the mouth, on the E side opposite Middle Ground, and at Saginaw 1.5 miles below Green Point. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, and launching ramps are available. Hoists to 50 tons are available for hull and engine repairs.

Communications.–Bay City and Saginaw have good highway and rail freight connections. Passenger and freight service are available at the Tri-City Airport, 12 miles SW of the river mouth.

Chart 14863.–From the mouth of the Saginaw River the W shore of Saginaw Bay extends 3 miles NW, thence NNW about 7 miles to **Nayanquing Point,** thence N about 11 miles to the mouth of the **Saganing River,** thence NNE about 5 miles to **Wigwam Bay,** thence E about 9 miles to Point Au Gres, and thence N and E for about 8 miles to Point Lookout. The shoreline in this reach is generally low and marshy with numerous cottages. The 18-foot contour extends from 5 miles N of the Saginaw River mouth NW to 3 miles E of Nayanquing Point and thence NE to Point Lookout, passing 1 mile off Point Au Gres. The flat inside the 18-foot contour is sandy and stony and generally shelving, with depths of 12 feet or less within 1 mile of that contour and depths of less than 7 feet extending over 1 mile off most of the shoreline. Off the mouths of some of the rivers in this reach, very shallow bars project well out over the flat.

Charts 14863, 14867.–The **Kawkawlin River,** emptying into Saginaw Bay about 2 miles NW of the mouth of the Saginaw River, is practically closed by the bar at its mouth. In 1969, the approach channel to the river mouth had a controlling depth of 3 feet. The channel is marked by buoys that are shifted to mark the best water. The Detroit and Mackinac Railway bridge crossing the river 0.8 mile above the mouth has a 34-foot fixed span with a clearance of 11 feet. The fixed highway bridge 0.2 mile upstream has a reported clearance of 10 feet. A **slow-no wake speed** is enforced on the river. Gasoline is available on the river.

Chart 14863.–The **Pinconning River** is about 5.5 miles N of Nayanquing Point. Two water tanks in the village of **Pinconning, Mich.,** about 2.5 miles W of the mouth of the river, are prominent. A marina on the S side of the river mouth provides gasoline, ice, a launching ramp, and limited engine repairs. In 1977, the reported controlling depth was 2 feet in the approach with 8 feet alongside the marina docks.

Pinconning Bar, extending about 3 miles E from the mouth of the Pinconning River, and **Saganing Bar,** extending about 3.5 miles E from the mouth of the Saganing River, are very shallow banks with about 2 feet near their outer ends.

Off the **Rifle River**, about 3.5 miles W of Point Au Gres, **Rifle Bar**, a shoal area with 1 or 2 feet of water, extends SE about 3 miles, with the 18-foot contour about 0.5 mile farther out. The Rifle River is navigable by canoes for about 10 miles above the village of Omer, Mich.

Point Au Gres is on the W side of Saginaw Bay about 25 miles NNE of the mouth of Saginaw River. The bottom is quite shallow and rocky to 1 mile off around the point, with 30 feet close outside of this limit. A buoy marks a submerged obstruction just off the end of the point.

Close NW of Point Au Gres, a 30-foot-wide canal provides refuge for small craft. In 1977, the reported centerline controlling depth in the canal was 4 feet. The entrance to the canal is marked by private buoys. Gasoline and water are available in the canal.

Between Point Au Gres and Point Lookout, 6.5 miles NE, a shallow bight has depths less than 18 feet extending 2 miles from its head. **Au Gres River** empties into the head of the bight.

Point Lookout Harbor is a harbor of refuge at the mouth of the Au Gres River about 2 miles S of the city of **Au Gres, Mich.**

Channels.–A dredged entrance channel leads NW from deep water in Saginaw Bay between parallel piers to the mouth of the river and thence upstream for about 2 miles to U.S. Route 23 highway bridge. The approach channel is marked by buoys and the outer ends of the piers by lights. In April 1981, the midchannel controlling depth was 8 feet in the bay channel to opposite North Pier Light 4, thence in March 1982, the midchannel controlling depths were 9 feet between the piers, thence 5½ feet for 1.5 miles beyond the piers, thence 2½ feet to the Route 23 bridge.

Bridges.–Two overhead power cables with a minimum clearance of 59 feet cross the river 2.3 miles above the outer ends of the piers. The U.S. Route 23 highway bridge, about 0.5 mile upstream, has a fixed span with a horizontal clearance of 15 feet on either side of the center pier and a vertical clearance of 8 feet.

A **slow-no wake speed** is enforced on the Au Gres River.

Small-craft facilities.–A marina on the S side of the river mouth and a Michigan State Waterways Commission facility just below the Route 23 bridge provide transient berths, gasoline, diesel fuel, water, electricity, marine supplies, sewage pump-out, and a launching ramp. Minor repairs are available at the marina. In 1977, depths of 2 to 5 feet were reported alongside the marina berths.

At **Point Lookout** (44°03.0′N., 83°34.8′W.), also known as **Gravelly Point**, a shoal with depths of 5 to 18 feet extends SE for 3 miles. **Gravelly Shoal Light** (44°01.2′N., 83°32.3′W.), 75 feet above the water, is shown from a white square tower on a cylindrical base near the outer end of the shoal; a fog signal and radiobeacon are at the light. This shoal is important because it restricts the available deep water between it and the Charity Islands for vessels making the Saginaw River. Vessels should not pass between the light and the point. Protection from N and W winds with holding ground in 20 to 30 feet, mud bottom, is close S of Point Lookout, but fish net stakes obstruct this area.

From Point Lookout to **Tawas Point** (44°15.1′N., 83°27.4′W.), 15 miles NNE, the shoreline is bordered by shoals extending 0.5 to 1.2 miles off. A 2-foot shoal is 0.6 mile SE of **Whitestone Point,** 4.5 miles N of Point Lookout. About 10 miles N of Point Lookout, shoals with depths of 4 to 7 feet extend 1 mile off. The shore in this reach is low from Point Lookout to Whitestone Point, thence bluff to Tawas City, and becomes low again to Tawas Point.

At **Alabaster, Mich.,** 9.5 miles N of Point Lookout, the United States Gypsum Co. operates an offshore wharf for loading crushed gypsum. A 6,800-foot aerial tramway connects the 310-foot wharf and the shore. The tramway cable, supported by eight towers, has a minimum clearance of 30 feet. The wharf has a deck height of 9 feet, and in 1977, had a reported depth of 23 feet alongside. The approach to the wharf is marked by a private **270°** lighted range on the outer end of the wharf and on a crib off the end of the wharf. The wharf is an open roadstead with protection from only W winds. Small craft should keep clear of the wharf because of the danger from falling rocks.

At **Port Gypsum,** 3.5 miles N of Alabaster, a 1,078-foot conveyor system connects the shore and a 650- by 80-foot offshore gypsum-loading wharf of the National Gypsum Co. The wharf has a deck height of 9 feet, and, in 1977, had reported depths of 22 feet alongside. There is open storage for 60,000 tons of gypsum. A privately dredged channel, marked by private buoys and a **293°30′** lighted range, leads from deep water in Saginaw Bay to a turning basin at the wharf. In 1977, the reported controlling depth was 20 feet in the channel and basin.

Tawas Bay is a bight about 4 miles wide, enclosed on the E by Tawas Point and on the N and W by the curving mainland. It is an excellent harbor, affording secure anchorage at its head in all but SW winds. The 18-foot contour is about 1.3 miles off the NW shore of the bay decreasing to 0.5 mile off the N shore. Inside this contour, the depths shoal gradually toward shore. On the E side of the bay, a sand flat with depths of 1 foot extends 0.4 mile SW and about 0.7 mile W from Tawas Point. At the NW limit of the flat, marked by a buoy, the depths increase rapidly to 20 feet or more. A lighted buoy off the SW limit of the flat marks the entrance to Tawas Bay.

Tawas Light (44°15.2′N., 83°26.9′W.), 70 feet above the water, is shown from a white conical tower with attached dwelling on Tawas Point; a fog signal is 0.6 mile SW of the light. The light has a **045°–135°** red sector which covers the sand flat on the W side of the point.

To anchor in Tawas Bay, vessels should round the lighted buoy SW of Tawas Point, and from a point about 800 feet W of the buoy, head **000°** until Tawas

Light bears 112½°; thence change course to about 060°. Anchor about 1 mile 315° from Tawas Light in about 22 feet of water, sand and clay bottom.

Tawas City, Mich., is on the NW side of Tawas Bay at the mouth of the **Tawas River**. Two water tanks in the city are prominent. In 1977, the reported controlling depth across the bar at the river mouth was 2 feet. A private **326°** lighted range marks the entrance to the river. A **slow-no wake speed** is enforced on the Tawas River. There are limited facilities for small craft in the lower part of the river. A marina at the mouth provides transient berths, gasoline, water, ice, electricity, some marine supplies, a launching ramp, and minor engine repairs.

East Tawas, Mich., is on the N shore of Tawas Bay about 2 miles NE of Tawas City. A lighted radio mast in the town is prominent. The Michigan State Waterways Commission dock provides transient berths, gasoline, water, electricity, and sewage pump-out. The northeasternmost arm of the dock has reported depths of 12 feet alongside. The dock is protected by a breakwater extension that should not be approached closely because of stone riprap. The breakwater extension is marked at the NE end by a light. Two fish docks in fair condition are about 0.3 mile E of the State dock. In 1963, depths of 3 feet were available alongside.

East Tawas Coast Guard Station is on Tawas Point 0.7 mile NE of Tawas Light.

A marina on the W side of the inner end of Tawas Point provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 15-ton lift is available for hull and engine repairs. The entrance to the marina is marked by private daybeacons and a private **128°** lighted range. In 1977, the reported controlling depths were 5 feet in the entrance channel and basin. A yacht club basin marked by a private **165°** lighted range is just SW of the marina.

From Tawas Point to **Au Sable Point** (44°20.0'N., 83°20.4'W.), about 8 miles NE, shoals and submerged net stakes extend about 1.3 miles offshore. Shoals with depths to 14 feet extend off the same distance around Au Sable Point. A lighted buoy is 2.7 miles ESE of the point.

From Au Sable Point N for 5 miles to the mouth of Au Sable River, the shore is low with no prominent landmarks. Along this stretch, shoals with depths of 9 to 15 feet extend as much as 2.1 miles offshore.

Au Sable Harbor, also known as **Oscoda,** is a harbor of refuge used mainly by pleasure craft at the mouth of the **Au Sable River**. The towns of **Au Sable, Mich.,** and **Oscoda, Mich.,** front the W and E sides of the river, respectively. A black water tank and a silver water tank, 1.2 miles NW and 2.6 miles N of the river mouth, respectively, are prominent. Both tanks are lighted.

Channels.–A dredged entrance channel enters the river from Lake Huron between parallel piers and leads upstream for about 0.2 mile to the U.S. Route 23 highway bridge. The outer ends of the piers are marked by lights; a fog signal is at the S light. In April 1984, the controlling depth was 8 feet in the approach channel, thence 5 feet between the piers, thence 2 feet (4 feet at midchannel) in the channel to the bridge.

Depths of about 2 to 3 feet can be carried for about 1 mile above the dredged channel.

Currents.–There is normally only a slight current through Au Sable Harbor, but strong currents prevail in the harbor when the dam a short distance above the harbor is being used for power generation.

A **slow-no wake speed** is enforced on the Au Sable River.

Small-craft facilities.–Marinas above the Route 23 bridge provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp.

Charts 14863, 14864.–From the mouth of Au Sable

Structures across Au Sable River

**Miles above North Pierhead Light*

***Clear width in feet proceeding upstream*

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
1	U.S. Route 23 bridge	Highway	0.42			81	23	Fixed.
3	Overhead cable	Power	0.44				44	
4	Overhead cable	Television	0.58				28	
5	Overhead cable		0.64				24	
6	Overhead cable		1.06				28	
7	Overhead cable	Telephone	1.08				28	
8	Mill St. bridge	Highway	1.09	45	45	48	12	Fixed. Center span is navigable.
9	Adams Ave. bridge	Highway	1.76			35	9	Fixed.
10	Detroit and Mackinac Ry. bridge	Railroad	2.76					Fixed. Data not available.
11	Wurtsmith bridge	Highway	6.46			33	13	Fixed.

River to Sturgeon Point, 21 miles N, shoals with depths less than 18 feet, and with numerous rocky patches of 12 to 16 feet near the outer limits, extend as much as 2.7 miles offshore. Deep-draft vessels should give this stretch a berth of 3 miles. The outermost danger is a boulder, covered 16 feet, 10.5 miles NNE of Au Sable River mouth. The shore in this reach is low for about 13 miles N of Au Sable to just N of the village of **Greenbush, Mich.,** where high bluffs begin a short distance back from shore and continue N past Sturgeon Point.

Oscoda Aero Light, maintained by the U.S. Air Force at Wurtsmith Air Force Base, is shown from a checkered water tank 3.4 miles NNW from the Au Sable River mouth.

Caution.–A special use airspace, bounded by the following coordinates, 45°17'00"N., 83°00'00"W.; 45°20'24"N., 82°31'18"W.; 44°31'00"N., 82°19'54"W.; 44°27'42"N., 82°47'08"W., is used periodically for air to air gunnery practice from the surface to an altitude of 45,000 feet from sunrise to sunset. The using agency is the Commander, Permanent Field Training Site Detachment, Phelps-Collins ANGB, Alpena, Mich., and the controlling agency is Minneapolis ARTC Center, Federal Aviation Administration.

Chart 14864.–Harrisville Harbor, about 17 miles N of the Au Sable River, serves the town of **Harrisville, Mich.,** and affords the only safe refuge for light-draft vessels between Au Sable and Alpena, Mich. The harbor provides adequate protection from all winds, but NE storms cause large swells in the harbor. A silver water tank on high ground about 0.7 mile W of the harbor is prominent.

Channels.–A dredged entrance channel leads SW from Lake Huron to a harbor basin formed by two detached breakwaters. The outer ends of the breakwaters are marked by lights. In June 1984, extensions to the breakwaters were under construction.

In 1983-1985, the controlling depth was 6½ feet in the entrance channel except for shoaling along the E edge, thence in 1985, 3½ to 8 feet in the basin except for shoaling to bare in the SE, NW, and SW corners. The S end of the harbor is not closed and is accessible by small craft with local knowledge. In June 1984, this entrance was reported closed because of shoaling.

Small-craft facilities.–A public dock in the SW part of the harbor, operated by the Michigan State Waterways Commission and the city of Harrisville, provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and harbormaster services. Minor engine repairs are available nearby.

About 0.5 mile N of Harrisville Harbor, Lakeshore Terminal and Pipeline Co. operates an offshore terminal for receiving petroleum products. Vessels tie up to mooring buoys in about 40 feet of water 1.5 miles offshore. A submerged pipeline extends from the offshore facility to a 350,000-barrel storage tank facility on shore. A private 270° lighted range on shore at the inner end of the pipeline marks the approach to the facility, and a private lighted buoy marks the outer end of the pipeline.

Sturgeon Point Light (44°42.7'N., 83°16.3'W.), 69 feet above the water, is shown from a white conical tower with attached dwelling on **Sturgeon Point,** 26 miles N of Au Sable Point and 3.8 miles N of Harrisville Harbor. A shoal with a depth of 8 feet near its outer end extends 1.5 miles NE from the point.

From Sturgeon Point, the shoreline trends N for 12 miles to South Point, the S entrance point to Thunder Bay. This stretch should be given a berth of 3 miles to avoid numerous submerged rocks inshore, and off-lying shoals with depths of 12 to 20 feet. The outermost shoal, 5 miles N of Sturgeon Point, extends 2.5 miles offshore. Off the mouth of **Black River,** 4.5 miles S of South Point, foul ground with submerged rocks and depths less than 8 feet extends 1.4 miles E and 2 miles NE, beyond **Black River Island.** Two sunken wrecks and a reported obstruction are about 2.5 miles E of the river mouth.

Thunder Bay is a large bight on the W side of Lake Huron; the mouth of the bay is 10 miles wide between **North Point** and **South Point. Thunder Bay Traffic Lighted Bell Buoy,** 3 miles S of North Point, marks the entrance to the bay. The bay provides shelter in all but SE weather with good holding ground generally near the shores. The N shore from North Point to **Whitefish Point** provides a good lee in NE gales with good holding ground close to shore in depths of 25 to 30 feet, clay and sand bottom. Submerged net stakes and two wrecks obstruct this area.

The S part of Thunder Bay, from South Point WNW to **Devils River,** is filled with shoals and submerged rocks extending 2.5 miles offshore. **Scarecrow Island,** 2 miles N of South Point, is near the outer edge of the shoal area.

Ossineke, on the SW side of Thunder Bay, is just above the mouth of Devils River. The mouth of the river is partially protected by a breakwater. In September 1981, the controlling depth in the river was reported to be less than 4 feet; the river is subject to shoaling and should not be entered without local knowledge. A pier about 1,000 feet inside the mouth can provide fuel for small craft.

From about 1 mile N of Devils River N to the vicinity of Sulfur Island, depths of 17 feet are within 0.5 mile of shore. A sandy flat with depths less than 12 feet connects the mainland and **Sulfur Island,** off the mouth of **Squaw Bay.** A rocky ledge with a depth of 1 foot near its outer end extends about 1 mile N from Sulfur Island to abreast **Partridge Point,** the N entrance point to Squaw Bay. Detached shoals with depths of 6 to 11 feet are 1 mile E and 1.5 miles SE of Sulfur Island. From Partridge Point N for 3.5 miles to the mouth of Thunder Bay River, numerous detached shoals extend 2 miles offshore. A 4-foot spot and an 8-foot spot are 1.5 and 2.5 miles NNE of Partridge Point, respectively. Numerous submerged net stakes are in deep water within 2 miles NE and E of Partridge Point.

A marina in a basin on the N side at the inner end of Partridge Point provides gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and a launching ramp. A 50-ton mobile lift is available for hull and engine repairs. The entrance is protected by jetties. The outer end of the S jetty is marked by a private light. In 1983, the reported controlling depth was 6 feet in the entrance channel and basin. A buoy reportedly marks a reef 200 yards NE of the entrance.

N of the marina, between Partridge Point and **Bare Point,** the bay is very shallow and foul.

Whitefish Bay is a shallow bight about 2 miles E of the mouth of Thunder Bay River. From Whitefish Point, on the E side of Whitefish Bay, SE for 5 miles to North Point, there is deep water within 1 mile of shore. However, this reach has numerous submerged net stakes and several obstructions. A wreck covered 21 feet and a 22-foot spot are 1.7 and 2.9 miles S of Whitefish Point, respectively. An obstruction, with unknown depth over it, is about 1.9 miles SSW of the point. A shoal with a least depth of 5 feet near its outer end extends 1.5 miles SE from North Point. The outer end of the shoal is marked by a buoy.

Alpena Harbor, serving the city of **Alpena, Mich.,** is on the NW shore of Thunder Bay at the mouth of **Thunder Bay River.** Commerce at the port is mainly salt, coal, gasoline, and bulk cement. Prominent are stacks, tanks, and a spire in town, and stacks at the cement plant E of town.

Alpena Light (45°03.6'N., 83°25.4'W.), 44 feet above the water, is shown from a red skeleton tower, upper part enclosed, on a crib on the N side of the river mouth. A fog signal and radiobeacon are at the light. Because of protective riprap, the light should not be passed close aboard even by vessels of shallow draft.

Channels.–A dredged entrance channel, marked by lighted and unlighted buoys, leads NW from the deep water in Thunder Bay through the mouth of Thunder Bay River to a turning basin 0.7 mile above the mouth. The channel enters the river on the N side of a pier that extends from the S side of the mouth. In June 1985, the controlling depths were 20 feet (21 feet at midchannel) in the entrance channel to 0.5 mile below Alpena Light, thence in 1984-June 1985, 13 feet (16 feet at midchannel) to the Second Avenue Bridge, thence in July 1980, 16 feet to the head of the project except for shoaling to 13 feet in the upper 200 feet and 13 to 15 feet in the basin.

From near the outer end of the dredged entrance channel, about 1.5 miles SE of the river mouth, a privately dredged channel extends 1.3 miles NNW to a basin at the Huron Cement Division, National Gypsum Co. The channel is marked by a private **344°** lighted range and by private buoys placed 50 feet outside the channel limits. In 1977, the channel and basin had a reported controlling depth of 23 feet.

About 0.6 mile SE of the river mouth, another privately dredged channel extends 0.6 mile N to the W facility of Huron Cement Division, National Gypsum Co. The channel is marked by a private **358°** lighted range. In 1977, the reported controlling depth in the channel was 17 feet.

Bridges.–The Second Avenue highway bridge crossing the river 0.4 mile above the mouth has a bascule span with a clearance of 12 feet. (See **33 CFR 117.1 through 117.59 and 117.655,** chapter 2, for drawbridge regulations.) In 1978, the bridge was reported to be inoperable. An overhead cable 0.8 mile above the river mouth has a clearance of 29 feet. The Ninth Avenue fixed highway bridge 1 mile above the mouth has a clearance of 12 feet.

Fluctuations of water level.–The annual range of fluctuation in Thunder Bay River is about 3½ feet. Day-to-day variations caused by wind and barometric pressure changes may amount to more than 1 foot. Strong N or S winds will occasionally cause considerable change within a few hours.

Weather.–(See page T-9 for **Alpena climatological table.**)

Alpena is a **customs station.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Harbor Regulations.–A **slow-no wake speed** is enforced in Alpena Harbor. The Chief of Police, who acts as **harbormaster,** enforces the harbor regulations. Copies of the regulations may be obtained from Chief of Police, City Hall, Alpena, Mich. 49707.

Towage.–Tugs are available from Saulte Ste. Marie. (See Towage under Saulte Ste. Marie.)

Wharves.–Alpena has three active deep-draft facilities. The W facility of the Huron Cement Division, National Gypsum Co. was inactive in 1977. The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operators.)

Huron Cement Division, National Gypsum Co. Wharves: in basin 1 mile ENE of the mouth of Thunder Bay River; 1,000-foot wharf on E side of basin; two 500-foot wharves at N end of basin; 23 feet alongside; deck heights, 7 feet; open storage for 350,000 tons of coal; silo storage for 200,000 tons of cement; loading spouts at E wharf, maximum rate 6,000 tons per hour; receipt of coal, shipment of bulk cement; owned and operated by Huron Cement Division, National Gypsum Co.

Abitibi Corp. Wharf: N side of mouth of Thunder Bay River; vessels usually lay in channel and tie up to bollards along 300-foot face; 16 to 22 feet alongside; open storage for 40,000 tons of coal; receipt of coal; owned and operated by Abitibi Corp.

Alpena Oil Co. Wharf: S side of mouth of Thunder Bay River; about 700-foot face; 17 feet alongside; deck height, 3½ feet; open storage for 25,000 tons of salt; pipeline connection at dock; receipt of salt and gasoline; owned and operated by Alpena Oil Co.

Small-craft facilities.–A marina developed by the Michigan State Waterways Commission is in a basin formed by breakwalls 0.3 mile SW of the river mouth. Entrance to the basin, marked on the E side by a private light, is from the SW. In July 1979, the reported controlling depths were 4 feet in the entrance and 5 feet in the basin. Gasoline, berths, diesel fuel, water, electricity, sewage pump-out facilities, marine supplies, and a launching ramp are available. A 25-ton hoist is available for hull and engine repairs.

Charts 14864, 14869.–From North Point, the broken shoreline, low and wooded, stretches generally NNW for 2.5 miles to Presque Isle. This stretch has numerous off-lying islands and detached shoals.

Thunder Bay Island, 3 miles ENE of North Point, is the outermost of a group of islands connected to shore by a shallow bank with numerous rocks, submerged and awash. **Thunder Bay Island Light** (45°02.2'N., 83°11.7'W.), 63 feet above the water, is shown from a white conical tower with attached dwelling on the SE shore of the island. A fog signal and radiobeacon are at the light. A shoal with depths of 2 feet extends 0.2 mile SE from the island. Deep-draft vessels should not pass inside Thunder Bay Island. The E side of the island is deep-to. A wreck, covered 43 feet, is 13.6 miles ESE of Thunder Bay Island Light.

Sugar Island, just W of Thunder Bay Island, is 2 miles NE of North Point. **Gull Island** is just N of Sugar Island. The passage between Sugar Island and North Point should only be used by small craft with local knowledge, because a rocky ledge makes out from the N side of the point almost to the island.

Between Sugar Island and Thunder Bay Island is a small area of shelter from NW, NE, and E winds with good holding ground in 6 to 10 feet. Entrance to this area is from S; it is unsafe to enter from N because of a shoal and small islet between the NW end of Thunder Bay Island and Gull Island. The holding ground S of Sugar Island and SW of Thunder Bay Island is not good, rock and stone bottom.

Misery Bay is a bight between the N side of North Point and **Potter Point** (45°05.6'N., 83°18.2'W.), 3 miles NNW. The bay is extremely shoal and filled with rocks and islands.

From Potter Point NNW for 7 miles to abreast Middle Island, the shoreline is irregular and shallow water extends generally less than 0.7 mile offshore. A boulder, covered 13 feet, is about 1 mile E of Potter Point. Submerged net stakes are 1 to 2 miles offshore. **Stoneycroft Point,** 1 mile N of Potter Point, is marked by a private light. Three piers and a launching ramp are on the S side of the point.

A large boulder bank with least depths of 22 to 24 feet is from 3 to 7.7 miles NE of Potter Point. The shoal is in the path of through traffic and is a danger to deep-draft vessels, especially during heavy weather. A visible wreck is near the NE extremity of the bank. In 1970, a cargo boom was reported extending 3 feet above the water 300 feet SW of the wreck. A submerged wreck is about 100 feet E of the visible wreck. A lighted bell buoy 0.2 mile ESE of the wreck marks the NE extremity of the bank.

Middle Island is about 1.5 miles offshore about 6.5 miles N of Potter Point. **Middle Island Light** (45°11.6'N., 83°19.3'W.), 78 feet above the water, is shown from a white conical tower, orange bands in middle, with detached dwelling on the E side of the island. The island is surrounded on all but the NE side by flats with depths less than 6 feet that extend about 0.2 mile off. A 5-foot shoal is about midway between the island and the mainland, and there are other patches with depths 9 to 12 feet. Passage through this area is not recommended without local knowledge. A small ledge with rocks that uncover is 0.6 mile SE of Middle Island. A lighted buoy is off the E side of the ledge and marks the E extent of the shallows surrounding Middle Island.

There is anchorage SW of Middle Island with protection from S through W to NE winds in fair holding ground, clay and boulder bottom. NW of the island there is protection from SE winds in good holding ground, mud and sand bottom. When using these anchorages, give the island sufficient berth to avoid the surrounding flats.

Rockport, Mich., about 2.4 miles WNW of Middle Island, is a small private harbor used primarily by sport fishermen. A small point of land protects the harbor on the E. The submerged remains of a former sand and gravel breakwater extend 500 feet N from the point. The area is very shoal and should be avoided. The pier and detached cribs of a former limestone loading dock are in the harbor. The inner crib is marked by a private light. The outer crib is in ruins and submerged. A basin SE of the pier has a natural launching ramp.

False Presque Isle Harbor, 3 miles N of Rockport, is a secure harbor protected on the N by **False Presque Isle** (45°16.0'N., 83°24.0'W.), a nearly detached body of land that projects E from shore. The harbor provides protection from SW through N to NE winds with fair anchorage in depths of 20 to 30 feet. The S side of the harbor is bordered by shoals with depths of 7 to 10 feet that extend 1.2 miles offshore. An 18-foot shoal is 0.9 mile SE of False Presque Isle in the center of the harbor approach. A boulder, covered 15 feet, is 0.5 mile SE of the 18-foot shoal.

From False Presque Isle, the shoreline extends NW for about 6 miles to Presque Isle. Along this stretch deep water is within 0.4 mile of shore except in the shallow bight on the NW side of **South Albany Point** (45°19.1'N., 83°27.2'W.).

Stoneport, Mich., about 2 miles NW of False Presque Isle, is a private harbor operated by the Presque Isle Corp. for the shipment of limestone. An L-shaped breakwater extends from shore 1,000 feet NE, thence 1,200 feet SE. A 928-foot dock with a deck height of 12 feet is along the inner side of the SE arm of the breakwater. The facility has open storage for 60,000 tons of limestone, and a conveyor system can load vessels at 5,500 tons per hour. In 1978, the reported controlling depth alongside was 25 feet. **Stoneport Light** (45°17.8'N., 83°25.1'W.), 55 feet above the water, is a private aid shown from a white cylindrical structure on the outer end of the dock. Private buoys mark the SW limit of the deep water in the dock area. A buoy about 0.8 mile SE of Stoneport Light marks the harbor approach.

Presque Isle, about 25 miles NNW of North Point, is a peninsula almost completely detached from the mainland. **Presque Isle Light** (45°21.5'N., 83°29.5'W.), 123 feet above the water, is shown from a white conical tower with attached dwelling on the N end of Presque Isle. The light marks the turning point for vessels bound for the Straits of Mackinac. The tower of an abandoned lighthouse is on the S end of Presque Isle.

Presque Isle Harbor, entered between Presque Isle on the N and **North Albany Point** on the S, is a safe but limited harbor and anchorage for small craft. The entrance to the harbor is marked by a **274°** lighted range. A bar across the entrance limits the draft of vessels entering the harbor, but vessels can carry a depth of about 10 feet on the range line. Inside the bar, the harbor has central depths of 13 to 18 feet.

The range should be followed closely when entering the harbor. Shoals extend N off North Albany Point, and a shoal with depths of 5 feet at its outer end extends 0.6 mile E from the S end of Presque Isle. A buoy is off the SE side of the 5-foot shoal.

To anchor in Presque Isle Harbor, enter on the lighted range, and when the abandoned lighthouse on Presque Isle bears NNE, haul up a short distance N or S of the range line and anchor. In 1978, shoaling to 5 feet was reported on the range line about 1,200 feet E of the front light.

A dock is reported available at a former marina on the N side of Presque Isle Harbor; no services are available. In 1978, 7 feet was reported in the approach along the extended axis of the dock. A sand shoal with a depth of 3 feet is just W of the approach line in about 45°20'24"N., 83°29'10"W.

North Bay, the indentation formed on the W side of Presque Isle, provides anchorage with shelter from E and S winds, but the bottom is rock. Enter the bay on a course of **157½°** using Presque Isle Harbor Range Rear Light, which shows across North Bay, as a guide. The bay has central depths of about 20 feet. The E shore should be given a berth of 0.3 mile and the W shore 0.25 mile. A 14-foot shoal extends from the W shore to near the middle of the bay.

Charts 14864, 14880.–The trend of the shoreline from Presque Isle is WNW for 12 miles to **Adams Point** (45°24.9'N., 83°43.0'W.), thence W for 4.7 miles to Rogers City, and thence NW for 6.6 miles to Forty Mile Point (45°29.2'N., 83°54.8'W.).

Black Point, 2 miles W of Presque Isle, has deep water within 0.25 mile. About 2 miles ESE of Adams Point, a detached 17-foot shoal is 1.2 miles offshore. As foul ground extends from shore to within 0.4 mile of this shoal, coasting vessels should take care to pass outside the detached shoal. From Adams Point to Forty Mile Point, deep water is generally within 0.5 mile of shore.

Calcite, Mich., 3.3 miles W of Adams Point, is a private harbor owned and operated by U.S. Steel Corp. for shipping limestone. The harbor is protected on the NW and N by a point and breakwater and to the SE by **Quarry Point.** The harbor affords no shelter from N to E winds except for small craft, which can enter the tug basin on an emergency only basis.

Calcite Light, a private 8-foot-diameter neon light at the inner end of the loading slip in Calcite, is prominent.

Channels.–A privately dredged entrance channel leads from deep water in Lake Huron SW for 0.3 mile. At the inner end of the channel, a loading slip extends SW and a dredged area along the dock face extends SE. A dredged tug basin protected by a breakwater arm is on the NW side of the entrance channel. The harbor approach is marked by a light on the outer end of the breakwater which protects the harbor; a fog signal is at the light. The channel is marked by two private lighted ranges. A **236°** range of red lights for incoming vessels marks an alinement along the S side of the channel. A range of green lights for outbound vessels leads **056°** at about midchannel. In 1978, the reported controlling depth was 25 feet in the entrance channel and loading slip. In 1972, the controlling depths were 25 and 14 feet in the S and N halves of the tug basin, respectively. The SE dock face had depths of 24 to 20 feet. Private lighted buoys mark the edge of shoal water SE of the entrance channel. Inbound vessels should keep N of these buoys.

Fluctuations of water level.–The harbor is subject to fluctuations of water level, and vessels drawing over 17 feet should obtain information from the harbor tugs before entering the harbor. Depth information and harbor blueprints can be obtained at the dock office on the S side of the loading slip. A water gage on the SW corner of the tug basin, lighted at night, shows the maximum depth to which vessels may be loaded and should be checked by vessel masters.

Towage.–Two tugs, LIMESTONE and DOLOMITE, are available in the harbor. Vessels turn around and are towed stern first for docking in the loading slip. The tugs monitor VHF-FM channel 16 (156.80 MHz) and should be contacted before entering the harbor. When the tugs are berthed, they may be contacted through radio station WLC, Rogers City.

Wharves.–The wharves on the N and S sides of the loading slip have lengths of 938 and 866 feet, respectively, with deck heights of 8 feet. There is open storage for over 200,000 tons of limestone. Conveyor systems can load vessels at 5,000 and 3,000 tons per hour at the N and S wharves, respectively.

Rogers City, Mich., is 4.6 miles W of Adams Point and 6.6 miles SE of Forty Mile Point. It is a center for the mining, processing, and transportation of limestone. The port is an open roadstead with no natural harbor, but two artificial basins provide protection for small craft. A silver water tank about 0.6 mile SW of the municipal basin is prominent.

An entrance channel marked by private buoys leads SW from deep water in Lake Huron to the municipal small-craft basin, which is formed by breakwaters and entered at the SE corner. The basin entrance is marked on either side by a private light. In 1972, the controlling depth in the basin was 4 feet. On the NW side of the municipal basin, commercial fishermen use a small basin formed by breakwaters. The entrance to the basin, from NE, has depths of 3 feet and is difficult in severe storms.

Rogers City is a **customs station.**

Gasoline, diesel fuel, water, electricity, sewage pump-out facilities, and a launching ramp are available in the municipal basin, which was developed by the Michigan State Waterways Commission.

Charts 14864, 14880, 14881.–Forty Mile Point is a rounding projection 6.6 miles NW of Rogers City and about 29 miles ESE of Cheboygan. **Forty Mile Point Light** (45°29.2'N., 83°54.8'W.), 66 feet above the water, is shown from a square white brick tower on a dwelling on the point.

Charts 14880, 14881.–The NW part of Lake Huron forms the approach to, and the E part of, the **Straits of Mackinac.** At its extreme NW end, the lake narrows abruptly to a width of 4 miles between **Old Mackinac Point** and **Point St. Ignace,** the narrowest part of the Straits of Mackinac. The NW end of the lake is obstructed by shoals, Reynolds Reef and Spectacle Reef near midlake and Martin Reef off the N shore, and by several islands, Bois Blanc Island the largest. The two main shipping channels through this area lead N and S of Bois Blanc Island.

From Forty Mile Point, the shoreline trends W for 6 miles to the E point of Hammond Bay. A 15-foot spot is 0.7 mile offshore 1.2 miles NW of Forty Mile Point Light. Along the rest of the stretch, deep water is within 0.5 mile of shore. At the E point of Hammond Bay a 10-foot shoal extends 0.5 mile NW.

Hammond Bay, an open bight 8.5 miles W of Forty Mile Point, provides shelter in winds from SE through S to NW. Shoals and numerous submerged net stakes extend 1 mile offshore around the bay. Fair anchorage is in the S part of the bay off the mouth of **Ocqueoc River.**

Rocky ledges extend as much as 0.8 mile offshore from Hammond Bay NW for 7 miles to **Ninemile Point,** thence 6 miles WNW to Cordwood Point.

Hammond Bay Harbor is a harbor of refuge about 3 miles NW of Hammond Bay and 4 miles SE of Ninemile Point. The harbor, formed by two detached breakwaters, is entered through a dredged entrance channel from the NW. In 1983, the controlling depth was 8 feet in the entrance channel, thence 8 to 10 feet in the basin except for lesser depths in the W corner. A mooring area maintained by the State of Michigan on the S side of the basin had a controlling depth of 6 feet in 1972-May 1982, except for shoaling in the SW corner.

Transient berths, gasoline, water, electricity, sewage pump-out facilities, a launching ramp, and harbor attendant services are available in the harbor basin. No other services are available because of the isolated location of the harbor.

At **Cordwood Point** (45°39.8'N., 84°20.0'W.), a lighted buoy marks the outer end of a reef with depths of 20 to 24 feet that extends 1.8 miles NE. During stormy weather with heavy seas, the reef is a danger to vessels transiting South Channel of the Straits of Mackinac.

The **Straits of Mackinac, South Channel** passes between the lower peninsula mainland shore and the S side of Bois Blanc Island. The E entrance is between Cordwood Point and Poe Reef, which is the SE extremity of a shoal area off the SE shore of Bois Blanc Island.

South Channel is a **regulated navigation area.** (See **33 CFR 165.1 through 165.13, and 165.901 (a) and (c),** chapter 2, for limits and regulations.)

Between Cordwood Point and **Cheboygan Point,** 4.5 miles W, the shore is low except that a high bluff is within 1 mile of the shoreline in the E part of the reach. A lighted mast on the bluff, 1.2 miles SW of Cordwood Point, is prominent. The shoreline in this reach should be given a berth of 1 mile. A shoal with a depth of 13 feet at its outer end extends 0.8 mile NE from Cheyboygan Point.

Duncan Bay indents the shoreline between Cheboygan Point and the mouth of the Cheboygan River, 2 miles SW. Shoals extend 0.6 mile off around Cheboygan Point and on the E side of Duncan Bay, leaving a narrow navigable channel leading SE from South Channel into Duncan Bay. Pilings from former lumber docks project from shore into the W side of Duncan Bay.

Several shoals border the S side of South Channel in the approach to the Cheboygan River. **Fourteen Foot Shoal** is a hard gravel ledge with depths of 15 to 20 feet 0.9 mile NW of Cheboygan Point. **Fourteen Foot Shoal Light** (45°40.8'N., 84°26.1'W.), 51 feet above the water, is shown from a white conical tower on a square structure in the center of the shoal; a fog signal is at the light. Because of protective riprap, the light structure should not be passed close aboard even by shallow-draft vessels. A buoy is on the NW edge of the shoal. A shoal with a depth of 19 feet at its outer end extends 2.2 miles N from the mouth of Cheboygan River and is marked by a buoy 1.9 miles NW of Cheboygan Point. The shoal has depths of 22 to 30 feet that extend 1.5 miles NW from the buoy and 1.5 miles offshore.

Aside from the above shoals, the shoreline is clear from the Cheboygan River NW for 15 miles to Mackinaw City, with deep water no more than 0.7 mile offshore.

Poe Reef, with a least depth of 8 feet, is a detached shoal on the N side of South Channel, 2.7 miles SE of Bois Blanc Island with shoals between. **Poe Reef Light** (45°41.7'N., 84°21.7'W.), 71 feet above the water, is shown from a white and black horizontally banded square tower on a concrete crib on Poe Reef. A fog signal, radiobeacon, and radar beacon

(Racon) are at the light. (See Racons, chapter 1, for additional information.) Because of protective riprap, the light structure should not be passed close aboard even by shallow-draft vessels. A buoy marks the S side of Poe Reef.

Bois Blanc Island, forming the N side of South Channel, is a wooded island 11.5 miles long with a maximum width of 6 miles. Shoal water with depths of about 7 to 24 feet extends from the SE side of the island almost to Poe Reef. Shoals extend about 0.7 mile off the S side of the island. A 15-foot spot is 0.7 mile SSW of **Packard Point** (45°43.3'N., 84°25.2'W.). Shelter for small craft is behind a breakwater on the S side of the island midway between Packard Point and **Pointe aux Pins.** The outer end of the breakwater is marked by a private light. Electricity is reported available at the breakwater.

Zela Shoal, with depths of 6 feet near its outer end and rocks awash near its midpoint, extends about 2 miles WNW from **Zela Point,** on the SW side of Bois Blanc Island 3 miles NW of Pointe aux Pins. The outer end of the shoal is marked by a buoy. The remainder of the SW shore of Bois Blanc Island between Pointe aux Pins and **Lime Kiln Point** has deep water within 0.4 mile.

Because of the shoals off Cordwood Point and Cheboygan Point, the recommended course through South Channel is from a point 0.6 mile NNE of the lighted buoy marking the shoals off Cordwood Point **270°** to a point 2,200 feet S of Poe Reef Light, thence **281°** to the lighted midchannel buoy 1.9 miles SSE of Pointe aux Pins, leaving the buoy to port, thence **302°** to the turning point 0.5 mile E of the center of the main towers of Mackinac Bridge, with Old Mackinac Point abandoned lighthouse bearing **198°.**

Charts 14880, 14881, 14886.–Cheboygan Harbor, serving the city of **Cheboygan, Mich.,** is 2.5 miles SW of Cheboygan Point in the lower part of the **Cheboygan River.** The harbor is a base for commercial fishermen and pleasure craft. The principal commodities handled in the port are petroleum products and coal.

Prominent features.–Three tanks and a stack in Cheboygan are prominent.

Channels.–The harbor is entered through a dredged entrance channel extending SW from deep water in the Straits of Mackinac South Channel to the mouth of Cheboygan River and thence upstream for about 1.6 miles. The entrance channel is marked by a lighted buoy, a light, and a **212°30'** lighted range. A turning basin is on the SE side of the channel just inside the mouth of the river. In 1982-1983, the controlling depths were 16 feet (21 feet at midchannel) through the entrance channel to the turning basin, thence 21 feet in the basin with lesser depths along the SE and SW edges, thence 15 feet (17 feet at midchannel) from the turning basin to the State Street bridge, thence in 1974, 18 feet at the bridge decreasing to 4 feet at the locks at the head of the project. The channels are subject to shoaling.

Fluctuations of water level.–The annual fluctuation of the water level of the Cheboygan River is about 3 feet. Day-to-day level changes due to wind and barometric pressure sometimes are 1 foot or more. Occasionally a considerable oscillation may take place within 1 or 2 hours, amounting to 1½ feet or more.

Harbor Regulations.–The city of Cheboygan has established harbor regulations, which the **harbormaster** enforces. Copies of the regulations may be obtained from the City Manager. A **slow-no wake speed** is enforced.

Wharves.–Cheboygan has four deep-draft facilities. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

Northwood Oil Co. Dock: W side of the river 0.65 mile above the mouth; 400-foot face; 21 feet alongside; deck height, 3 feet; pipelines extend to tank storage, capacity 33,500 barrels; receipt of gasoline and fuel oil; owned by G.E.F.S. Marine Terminal and operated by Northwood Oil Co.

G.E.F.S. Marine Terminal: W side of the river immediately above Northwood Oil Co. Dock; two 300-foot sections; 21 feet alongside; deck height, 3 feet; open storage for 40,000 tons of coal; receipt of coal; owned and operated by G.E.F.S. Marine Terminal.

Amoco Oil Co. Wharf: E side of the river 0.65 mile above the mouth; 290 feet of berthing space along dolphins; 21 feet alongside; deck height, 7½ feet; pipelines extend to tank storage, capacity 171,000 barrels; receipt of gasoline and fuel oil; owned and operated by Amoco Oil Co., Division of Standard Oil Co.

Aggregates Dock: E side of the river above Amoco Oil Co. Wharf; deep-draft vessels lay in dredged channel and discharge by boom; 160,000 square feet open storage; receipt of aggregates; operated by various concerns.

Small-craft facilities.–The city of Cheboygan and the Michigan State Waterways Commission provide berthing space for small craft on the W side of the river just above the State Street bridge. A marina is just upstream and just below the bridge. Berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and marine supplies are available. A 25-ton fixed hoist is available for hull and engine repairs.

Ferry.–A U.S. Mail boat and ferry operates from the W side of Cheboygan River above the State Street bridge to the breakwater on the S side of Bois Blanc Island. The ferry operates from about April to December depending on ice conditions. The ferry carries passengers and cargo, and autos on a reservation only basis.

Lock.–At the upper end of the dredged channel, a lock connects Cheboygan Harbor and the Inland Route. The lock is 75 feet long and 18 feet wide with a lift of about 13½ feet. The depth over the lower miter sill is about 5 feet at Lake Huron stage of Low Water Datum, and the depth over the upper miter sill is about 8½ feet when the upper pool is level with the crest of the dam. The Michigan State Waterways

Commission operates the lock and prescribes regulations and fees governing the use of the lock. The Waterways Commission maintains a small dock, about 50 feet long with a least depth of 5 feet alongside, immediately downstream of the lock entrance.

Boaters proceeding upstream to use the lock are cautioned to anticipate water discharged at right angles to the stream at the powerhouse adjacent to the Charmin Paper Company. This current commences just after a bend in the river channel to the SE and is sufficient to force a boat proceeding at reduced speed into the opposite bank.

Michigan State Waterways Commission Cheboygan River Navigation Lock Regulations.–1. When approaching the lock for passage, either upbound or downbound, boatmen shall signal the lock operator with one long and two short blasts of the vessel's horn, siren, or whistle.

2. Vessels shall not approach closer than 50 feet of the lock structure before signaling the lock operator and, upon signaling, shall maintain that distance until advised otherwise by the lock operator.

3. All tolls must be settled before passing the lock. The toll shall be assessed upon the length of the vessel as indicated on satisfactorily documented evidence produced by the vessel owner or captain.

4. All persons using or navigating the lock or canal will be held responsible for any damages they may cause to either, or to the works or structures at the entrance to the canal.

5. No boat, float, watercraft, vessel, or material of any kind will be allowed to be moored or to remain in the lock or canal, or to obstruct the entrance to either, without the permission of the Commission or for a longer time than may be allowed by it or its agents; and in case of any violation of this regulation, the Commission may, at its option, remove such obstruction and charge the owner with the expense of the removal and care thereof, which must be fully paid or settled before such boat, watercraft, or material shall be permitted to pass the lock.

Operation Schedule.–1. From April 15, to and including Memorial Day, and from September 15, to and including October 31, the lock will be operated only between the hours of 9 a.m. and 5 p.m. on application at the Department of Natural Resources office located at 120 A Street, Cheboygan, Michigan; telephone, 616-627-9011.

2. From the day after Memorial Day to and including June 14, and from the first Monday following Labor Day, to and including September 14, the lock will be operated only between the hours of 9 a.m. and 5 p.m. on application to the lock operator.

3. From June 15, to and including the first Sunday following Labor Day, the lock will be operated only between the hours of 9 a.m. and 9 p.m. on application to the lock operator.

Chart 14886.–Inland Route is a series of connecting waters, comprising the Cheboygan River, Mullett Lake, Indian River, Burt Lake, Crooked River, and Crooked Lake, in all, about 36 miles long. The waterway extends from Cheboygan to Conway, Mich., about 2 miles inland from the head of Little Traverse Bay in Lake Michigan. The waterway also includes Pickerel Lake, which is connected by a short channel to Crooked Lake.

The **Cheboygan River** is the outlet of Mullett Lake and other waters of the Inland Route, navigable by tugs, launches, and flat scows. A lock and dam separate the upper part of the river from the lower harbor. Above the lock, the Cheboygan River is generally wide and deep for 2.8 miles to its junction with the Black River. Above this junction, the river outside the channel is foul with stumps and snags for the remaining 2.5 miles to Mullett Lake. The channel above the junction is marked by daybeacons. In 1971, the controlling depth in the channel at the head of Cheboygan River to Mullett Lake was 2½ feet.

A **slow-no wake speed** is enforced on the Cheboygan River.

The **Black River** extends SE from its junction with Cheboygan River for about 10 miles to **Black Lake.** The river is wide and deep for its lower 2.5 miles. Above this point, the foul ground along shore widens, and even shallow draft boats must use care to traverse the remaining 2.8 miles to **Alverno Dam.** A marine railway, maintained by the Consumers Power Co., provides access to the pool above the dam. The waters above the pool are uncharted, and rapids in the river make navigation hazardous.

A **slow-no wake speed** is enforced on the Black River.

Mullett Lake, drained at its N end by the Cheboygan River, is about 10 miles long and 3 miles wide. The lake is generally deep, with depths over 100 feet in the S central part. The entrance to the Cheboygan River at the N end of the lake is marked by a buoy and a light. A detached 4-foot shoal marked by a lighted buoy is about 1.7 miles SSW of the Cheboygan River entrance. A 2-foot shoal extends 0.6 mile off the W shore of the lake at the S end. A small-craft basin protected by jetties is at Aloha State Park on the E side of the lake. The outer ends of the jetties are marked by private lights.

Indian River flows NE from Burt Lake and empties into the S end of Mullett Lake. The lower 2 miles of the river is about 0.7 mile wide, but is filled with marsh, stumps, and snags. The upper part of the river is narrow and curving. A narrow winding dredged channel, well marked by daybeacons, leads through the river. A lighted buoy marks the entrance from Mullett Lake. Parallel jetties protect the Burt Lake entrance; a light marks the outer end of the N jetty.

In Indian River, operation of vessels at high speed or towing water skis or similar contrivances is prohibited between daybeacons 25 and 40 and between daybeacons 57 and 63. A **slow-no wake speed** is enforced between daybeacons 40 and 57 and between daybeacon 63 and the head of the river.

Burt Lake is about 10 miles long N and S and has a

Structures across the Inland Route

**Miles above Lake Huron*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	Cheboygan River							
1	State St. (U.S. Route 23) bridge	Highway	0.92			60	9	Bascule. Note 1.
2	Overhead cable	Power	1.39				47	
3	Overhead cable	Power	1.59				44	
	Cheboygan River Lock		1.64					
4	Overhead cables		1.65				38	Across the lock.
5	Overhead cable	Power	1.74				37	
6	Overhead cable		1.93				26	
7	Lincoln Ave. bridge	Highway	1.93			81	16	Fixed. Being removed. New bridge under construction.
7A	Overhead cable		1.93				26	
8	Overhead cable		3.60					Data not available.
9	Overhead cable	Power	3.64				40	
10	Route 33 bridge	Highway	5.25			58	16	Fixed.
11	Overhead cable		5.25				20	
12	Overhead cable	Power	5.26				31	
13	Overhead cable	Telephone	5.27				25	
14	Detroit and Mackinac Ry. bridge	Railroad	5.33			110	21	Fixed.
15	Overhead cable	Power	6.11				40	
16	Overhead cables		6.24					Data not available.
17	Overhead cable	Power	6.71				38	
	Indian River							
18	Route I-75 bridge	Highway	19.67			53	15	Fixed.
19	Overhead cable		20.01				40	
20	ConRail bridge	Railroad	20.52			79	17	Fixed.
21	Route 27 bridge	Highway	20.53			84	15	Fixed.
	Crooked River							
22	Overhead cables	Power & Telephone	29.93				41	
23	Route 68 bridge	Highway	32.75			64	18	Fixed.
24	Overhead cable		32.77				20	
25	Alanson bridge	Highway	32.99			21	5	Swing. Note 2.
	Crooked River Lock		33.36					

Note 1.–See 33 CFR 117.1 through 117.59 and 117.627, chapter 2, for drawbridge regulations.
Note 2.–See 33 CFR 117.1 through 117.49, chapter 2, for drawbridge regulations.

maximum width near its center of 4 miles. It has depths up to 50 feet and no detached shoals. The mouth of the Crooked River, marked by a light, is near the center of its W side.

The **Crooked River** extends SW from Burt Lake for about 5 miles through marshy ground to the NE end of Crooked Lake. The channel through the lower part of the river is marked by daybeacons. **Alanson, Mich.,** is on the river about 0.7 mile below Crooked Lake. The Crooked Lake entrance to the river is marked by a light.

Crooked River Lock, 0.3 mile below Crooked Lake, is usable by vessels to 60 feet long and 16 feet wide. The vertical clearance through the lock is 15 feet when the upper pool is at Low Water Datum. The depth over the sill is 6 feet when the lower pool is at Low Water Datum. (See **33 CFR 207.476,** chapter 2, for lock regulations.)

Crooked Lake, roughly triangular, is 4 miles long and about 2 miles wide at its center. **Oden Island,** just E of the center, extends almost across the lake leaving a narrow channel along its N side. The channel through Crooked Lake is marked by buoys and daybeacons. The village of **Oden, Mich.,** is on the N shore of the lake, NW of Oden Island.

Overland Trailer Service.–Completing the inland route between Lake Huron and Lake Michigan, a portage service is available at the Windjammer Marina about 1 mile W of the village of Oden. Transportation in either direction can be arranged for trailerable craft to 25 feet long and less than 5,000 pounds gross weight between Crooked Lake and Little Traverse Bay on Lake Michigan, a distance of about 8 miles. An advance notice of 24 hours is requested. Information on fees and reservations may be obtained by telephone or by writing to: Windjammer Marina, Inc., Oden, Mich. 49764; telephone, 616–347–3918.

Conway, Mich., a small community at the W end of Crooked Lake, is the limit of navigation through the Inland Route. There is no navigable water for any type of small craft between Conway and Little Traverse Bay. **Pickerel Channel** leads from the SE side of Crooked Lake for about 0.5 mile to **Pickerel Lake.** The entrance to the channel is marked by a light.

Channels.–In 1976, the controlling depths in the Inland Route were 3 feet in Indian River between Mullett Lake and Burt Lake, 2 feet in Crooked River from Burt Lake to Alanson, and ½ foot from Alanson to Crooked Lake. In 1972, the controlling depth in Pickerel Channel was 3 feet.

Navigation regulations.–(See **33 CFR 207.490,** chapter 2, for navigation regulations.)

Small-craft facilities.–There are marinas on the upper Cheboygan River, near the N end of Mullett Lake, on the Indian River, on Burt Lake, at Alanson, and near Oden on the N shore of Crooked Lake. Most small-craft facilities are available at these marinas.

Charts 14880, 14881.–Mackinaw City, Mich., is a village and railroad terminus on **Old Mackinac Point,** the northernmost point of the lower peninsula of Michigan. A water tank, a radio tower, and the abandoned lighthouse on Old Mackinac Point are prominent.

Channels.–A harbor basin on the E side of Old Mackinac Point is enclosed by a railroad pier with a breakwater extending N from its outer end and by a combination breakwater and dock extending from shore on the N side of the railroad pier. A light on either side marks the entrance to the basin from N. In 1983, the controlling depth was 9½ feet in the entrance channel.

Dangers.–The submerged ruins of piers are 1,200 feet N and 200 feet S of the railroad pier. Each of the ruins extends 600 feet from shore.

Wharves.–A railroad-car ferry operates from the S side of the railroad pier to St. Ignace. Passenger ferries operate to Mackinac Island from the State Dock and from a private dock, 800 and 2,700 feet S of the railroad pier, respectively.

Marathon Oil Co. receives gasoline and fuel oils in a slip on the N side of the State Dock. There is 175 feet of berthing space with depths of 24 feet reported alongside and a deck height of 16 feet. The wharf has tank storage for 110,000 barrels of products.

Small-craft facilities.–Transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, sewage pump-out facilities, and a launching ramp are available in the harbor basin. A 12-ton hoist is available for hull and engine repairs.

The **Straits of Mackinac** connect Lake Huron and Lake Michigan. From the N side of Bois Blanc Island, the straits lead W through Round Island Passage between Round Island and Mackinac Island, thence between Old Mackinac Point on the lower peninsula and Point St. Ignace on the upper peninsula to Lake Michigan.

Spectacle Reef, with a least depth of 5 feet, is in the approach to the Straits of Mackinac, 10.5 miles E of Bois Blanc Island. **Spectacle Reef Light** (45°46.4'N., 84°08.2'W.), 86 feet above the water, is shown from a gray conical tower on a square concrete pier on the NW side of the shoal.

Raynolds Reef, with a least depth of 11 feet, is 6 miles E of Bois Blanc Island. A buoy marks each end of the reef, 1.5 miles long E and W.

From **Lafayette Point,** the NE point of Bois Blanc Island, the N shore of the island is generally deep-to for 7.5 miles to **Point Detachee. Lighthouse Point** juts about 2 miles N from midlength of this reach. A shoal with depths of 11 to 19 feet extends 0.6 mile NW from the point. **Bois Blanc Light** (45°48.6'N., 84°25.2'W.), 42 feet above the water, is shown from a white skeleton tower with a small house on Lighthouse Point. From Point Detachee to the W end of Bois Blanc Island, the shoal border increases to a width of about 1 mile.

Round Island, small and hilly, is just off the NW end of Bois Blanc Island, separated from it by very shallow water with submerged rocks. Buoys on the S side of Round Island Passage mark shoal water extending N from Round Island. An abandoned lighthouse is on the NW tip of the island.

Round Island Passage, the dredged channel between Round Island and Mackinac Island, had a controlling depth of 28 feet in July 1978. The S edge of the channel is marked by two lighted buoys. The N side of the passage is marked by a lighted bell buoy off the SE end of Mackinac Island and by Round Island Passage Light. **Round Island Passage Light** (45°50.6'N., 84°36.9'W.), 71 feet above the water, is shown from a white skeleton tower on an octagonal white structure on a red square house on a white base on the N side of the passage about 150 feet outside the channel limit. A fog signal, radiobeacon, and a radar beacon (Racon) are at the light. (See Racons, chapter 1, for additional information.)

Mackinac Island, 0.6 mile NW of Round Island, is about 3 miles long and 1.8 miles wide. The island is very bold, and its shores are generally rocky and deep-to. A lighted bell buoy marks the extent of shoals off the SE corner of the island. A detached shoal with a least depth of 15 feet is 1.4 miles off the E shore of the island, at about its midlength.

A **regulated navigation area** is between the W side of Mackinac Island and the mainland. (See **33 CFR 165.1 through 165.13, and 165.901 (a) and (c),** chapter 2, for limits and regulations.)

Mackinac Island, Mich., is a resort village and small-craft harbor on the shores of the semicircular bay at the SE end of Mackinac Island. The bay opens toward the SE between **Biddle Point** on the W and **Mission Point** on the E. A water tank and hotel cupola NW of the harbor entrance and a church spire N of the harbor entrance are prominent. The harbor is partially protected by a breakwater extending S from Mission Point and by a detached breakwater extending SE from off Biddle Point. The outer ends of the breakwaters are marked by lights. While also protected by Mackinac Island and Round Island from N and S winds, respectively, the harbor is subjected to heavy seas through the Straits when the wind is E or W.

On the NW side of the harbor, Union Terminal Piers, Inc. operates a 700-foot passenger pier and a 400-foot coal pier, each marked at the outer end by a private light. In 1969, depths at the outer end of the piers were 13 and 11 feet, respectively.

Ferries.–Passenger ferries operate between Mackinac Island and Mackinaw City from May to October and between Mackinac Island and St. Ignace from April to December, ice conditions permitting.

Small-craft facilities.–Transient berths, gasoline, water, electricity, and sewage pump-out facilities are available at the Michigan State Waterways Commission pier on the N side of the harbor. In 1978, depths of 6 to 14 feet were reported alongside. Gasoline is available at the coal dock.

Majors Shoal, a dangerous rocky ledge with a least depth of 10 feet, is 2.4 miles WSW of Round Island. The ledge, 0.7 mile long E and W, is marked by a buoy and a lighted buoy on the E and W ends, respectively. The ledge is on the S side of the vessel passage between Round Island Passage and Mackinac Bridge.

A wreck, covered 32 feet, is marked by a lighted buoy 2.1 miles S of Majors Shoal, close S of the vessel route through Straits of Mackinac South Channel.

Graham Point (45°51.0′N., 84°42.2′W.) is the SE extremity of Point St. Ignace on the N side of the Straits of Mackinac. In 1971, submerged dock ruins were reported 210 feet off the S shore of Graham Point. **South Graham Shoal,** with a least depth of 2 feet, and **North Graham Shoal,** with a least depth of 4 feet, are 1.5 miles S and 1 mile SE of the point, respectively. South Graham Shoal is marked on the S side by a buoy and North Graham Shoal is marked on the E side by a lighted bell buoy. Depths between the two shoals are 15 to 20 feet, and there is a channel with a least depth of 19 feet between the shoals and Graham Point. Currents in the vicinity of the Graham Shoals and the Straits of Mackinac are often strong and irregular.

Mackinac Bridge spans the Straits of Mackinac between Old Mackinac Point and Graham Point. The center suspension span of the bridge has a clearance of 148 feet at the center decreasing to 135 feet at each end. The main navigation channel through this span is marked by lighted and unlighted buoys. (The bridge is more fully described in chapter 11, Lake Michigan.)

St. Ignace, Mich., is a resort community and ferry terminal in **East Moran Bay** on the N side of Graham Point.

St. Ignace Coast Guard Station is on the E side of Graham Point. A U.S. Coast Guard **marine inspection office** is at St. Ignace. (See appendix for address.)

Wharves.–On the E side of Graham Point, the State of Michigan has constructed two 460-foot docks. The slips on the N side of the S dock and on the S side of the N dock have been dredged to 22 feet and 27 feet, respectively. The slip on the outside of each dock has been dredged to 20 feet. In 1980, the docks were being used for the docking of Coast Guard vessels.

Ferries.–Several ferry companies operate from St. Ignace. The Mackinaw Transportation Co. dock (45°51′56″N., 84°43′00″W.) has railroad-car ferries to Mackinaw City. Several docks in East Moran Bay have passenger ferries to Mackinac Island.

Small-craft facilities.–At the State Dock, 850 feet N of the Mackinaw Transportation Co. dock, a small-craft basin developed by the Michigan State Waterways Commission and protected by a breakwater extension provides gasoline, water, electricity, sewage pump-out, and a launching ramp. The basin is marked by a private light on the outer end of the breakwater and by private buoys. In 1978, depths of 6 feet were reported alongside the berths.

Rabbit Back Peak is a bold headland jutting E about 4.5 miles N of Graham Point. Shoals with submerged rocks extend 0.5 mile SE from the point. The bight on the S side of the point has shoals to 0.8 mile offshore. The bay between Rabbit Back Peak and **Grosse Point** (45°58.5′N., 84°41.2′W.), 4 miles N, has shoals extending 1 mile offshore in the N part. Grosse Point should be given a berth of 0.5 mile.

St. Martin Bay, 7 miles N of Mackinac Island, is formed between Grosse Point on the W and **St. Martin Point** (45°58.1′N., 84°31.7′W.) on the E. St. Martin Island and Big St. Martin Island divide the mouth of the bay into three deep passages. The bay has depths of 24 feet to within 1 mile of shore except in the NW and NE corners where the sandy flats extend 1.5 miles offshore.

Big St. Martin Island, 2 miles E of Grosse Point, has deep water within 0.5 mile of its shores. **St. Martin Island,** 1.5 miles E of Big St. Martin Island, has deep water within 0.3 mile of shore except on the S side where shoals with small islets and rocks, awash and submerged, extend about 1 mile S.

A small islet is 0.6 mile S of St. Martin Point with shoals between and extending about 0.3 mile S and SE from the islet. **Search Bay** is between St. Martin Point and **Brulee Point,** about 3 miles E. The bay has deep water to within 1 mile of its head except for a 16-foot spot in the middle of the entrance.

Charts 14881, 14885.–Goose Island, 3.3 miles SE of Brulee Point, is 1.3 miles long NW and SE and 1,000 feet wide or less. The island is on a very shallow bank that extends about 0.5 mile offshore around the island. The bank is covered with numerous small islets and rocks, submerged and awash. The S end of the bank is marked by a buoy. **Goose Island Shoal,** with a least depth of 2 feet, is 3 miles SW of Goose Island. The shoal is marked on the SE side by a buoy and on the W side by a lighted buoy.

Charts 14880, 14881, 14885.–Les Cheneaux Islands are an extensive island group bordering the shore for about 15 miles E from Brulee Point. The islands and their neighboring shoals, as well as the numerous points jutting among them from the adjacent shoreline, have a characteristic trend from NW to SE. The many inlets and channels formed between the islands and points have considerable deep water, but are so obstructed by banks and detached shoals as to be navigable only by small craft.

Channels.–A small-craft channel, marked by lighted and unlighted buoys, leads from Brulee Point on the W generally between the N side of the islands and the mainland to the E entrance through **Scammons Harbor,** about 8 miles E of Brulee Point. The channel is dredged along the N sides of **Marquette Island** and **La Salle Island,** the largest islands in the group. Another dredged channel leads through **Middle Entrance** between Marquette Island and **Little La Salle Island.** In 1973–1977, the controlling depth in the dredged channels was 7 feet, except for 6 feet in Middle Entrance channel.

Numerous private buoys and several private lights mark small-craft hazards, such as rocks and shoals, throughout the island group. Several private buoys also mark secondary channels used by local boatmen.

Hessel, Mich., is a town 3 miles NE of Brulee Point opposite the NW end of Marquette Island. A public docking facility developed by the Michigan State Waterways Commission behind a breakwater just S of the Post Office provides water, transient berths, gasoline, electricity, and a launching ramp. Marinas to the E and W provide gasoline, diesel fuel, and marine supplies. A 12-ton hoist can handle 42-foot boats for hull, engine, and minor electric repairs.

Cedarville, Mich., is 3.3 miles E of Hessel, opposite the N end of La Salle Island. A marina 0.8 mile S of the town provides transient berths, water, electricity, sewage pump-out, and marine supplies. A 50-ton lift can handle 60-foot boats for hull and engine repairs.

Port Dolomite, Mich., on the NE side of the entrance to **McKay Bay** about 4 miles E of Cedarville, is a private dock of the U.S. Steel Corp., Cedarville Plant, Limestone Operations. A channel privately dredged to a depth of 27 feet leads from deep water NW to the L-shaped dock at the facility. A private **309°** lighted range on the dock marks the approach. Vessels berth along the SW face of the dock. In 1969, the controlling depth alongside the dock was 29 feet. A private lighted buoy just S of the dock marks the N end of a shoal with a least depth of 14 feet.

There are several dangers in the approach to Port Dolomite. **Crow Island,** 2 miles SE of Port Dolomite, is marked at the NW end by a private light. Shoals extend 0.1 mile N and 0.5 mile SE from the island. A shoal, marked off the SE side by a private lighted buoy, has a least depth of 10 feet 0.4 mile SW of Crow Island. **Surveyors Reef,** with several bare spots, is 1 mile SE of Crow Island. A private lighted buoy marks the NW end of the reef. **Tobin Reef,** with several bare spots, is marked at the NW end by a buoy 1.3 miles SE of Surveyors Reef. A 16-foot shoal is 0.6 mile W of Tobin Reef. **Pomeroy Reef,** with a least depth of 12 feet, is 0.9 mile S of Tobin Reef. A lighted gong buoy off the W end of the reef marks the turning point for vessels bound for Port Dolomite.

Charts 14880, 14881, 14882.–Martin Reef, with a least depth of 1 foot, is about 1.5 miles E of Pomeroy Reef. It is at the E end of Les Cheneaux Islands and is the outermost danger in this stretch, lying near the vessel route between De Tour Passage and the Straits of Mackinac. **Martin Reef Light** (45°54.8'N., 84°08.9'W.), 65 feet above the water, is shown from a white square tower on a concrete crib on the SE part of the reef. A fog signal is at the light. The light should not be passed close aboard even by shallow-draft vessels, because of protective riprap.

From **Beaver Tail Point** (45°58.0'N., 84°10.3'W.) E for 12.5 miles to Point De Tour, the shoreline continues irregular with numerous off-lying shoals and small islands, and should be given a berth of 1.3 miles. **Beaver Tail Reef,** with a least depth of 5 feet and submerged rocks, is 1 mile SE of Beaver Tail Point. **St. Vital Point** (45°56.9'N., 84°00.0'W.), about 8 miles E of Beaver Tail Point, forms the W side of **St. Vital Bay.** Shoals extend about 0.7 mile E from the tip of the point, and shoals extend about 1 mile SE from shore on the NE side of the bay. Between these two banks, there is deep water to within 0.5 mile of the head of the bay. A detached 15-foot shoal is 1.7 miles E of St. Vital Point.

Point De Tour (45°57.4'N., 83°54.8'W.) is on the W side of the entrance to De Tour Passage, the entrance to St. Marys River. (The passage is described in chapter 12, St. Marys River.) A shoal with a depth of 11 feet at its outer end extends 0.6 mile SW from the point. **De Tour Reef,** with a least depth of 15 feet, extends about 0.7 mile SE from the point. **De Tour Reef Light** (45°57.0'N., 83°54.2'W.), 74 feet above the water, is shown from a white square tower on a crib on the SE end of the reef. A fog signal, radiobeacon, and a radar beacon (Racon) are at the light. (See Racons, chapter 1, for additional information.) The light marks the W side of the entrance to De Tour Passage.

Crab Island Shoal, with rocks nearly awash, is 0.3 mile S of **Crab Island,** which is connected to **Barbed Point** at the W end of Drummond Island. A lighted bell buoy at the W end of the shoal marks the E side of the channel through De Tour Passage.

Charts 14880, *2295, 14882.–Drummond Island, the easternmost part of the upper peninsula of Michigan, extends from De Tour Passage 20 miles E to False Detour Channel and has a maximum width of about 12 miles N and S. The S shore of the island fronts on Lake Huron, the NE shore on North Channel, and the NW shore is indented by Potagannissing Bay.

From Barbed Point N for 3 miles to **Black Rock Point** (46°00.6'N., 83°51.9'W.), the W shore of Drummond Island fronts De Tour Passage. Drummond Dolomite, Inc. operates a dock for the shipment of dolomite 1.3 miles N of Barbed Point. The 800-foot dock has a deck height of 10 feet and depths of 23 feet reported alongside. A conveyor system can load vessels at 4,000 tons per hour. When approaching or leaving the dock, avoid the shoals marked by buoys N and S of the dock.

Potagannissing Bay, a deep, wide passageway between the NW side of Drummond Island and St. Joseph Island, connects the W end of North Channel with the St. Marys River immediately N of De Tour Passage. However, the bay is obstructed by numerous islands and by many shoals which make up abruptly from deep water. A channel marked by lights and lighted and unlighted buoys leads through the NW part of the bay.

Potagannissing Bay indents the NW shore of Drummond Island between **Sims Point** (46°01.6'N., 83°50.6'W.) and **Chippewa Point** (46°05.9'N., 83°43.2'W.). **Drummond, Mich.,** a town on the S side of the indentation 4.5 miles E of Sims Point, has a sawmill and limestone quarries. A marina at the town provides gasoline, diesel fuel, water, electricity, sewage pump-out, marine supplies, and a launching ramp. A 12-ton hoist can handle craft to 40 feet for hull and engine repairs.

A **U.S. Customs** representative is available at Drummond.

The N shore of Drummond Island, from Chippewa Point to **Reynolds Point** 6.5 miles E, is deep-to. From Raynolds Point SE for 8.8 miles to Marble Head, the shore continues deep-to except in the vicinity of **Shoal Point** (46°03.5'N., 83°33.3'W.). **Humphrey Rock,** covered 9 feet, is 0.9 mile E, and **Lindsay Bank,** with a least depth of 11 feet, is 1.2 miles SE. A 21-foot spot is 1.1 miles NNE of Shoal Point. **Marble Head** (45°59.2'N., 83°28.4'W.), the highest point on Drummond Island, is on the W side of the entrance to False Detour Channel from North Channel. Two indentations on the NW side of Marble Head, **Glen Cove** and **Sitgreaves Bay,** provide protection from S and W winds with good anchorage in depths of 24 feet and more, mud and clay bottom.

From Marble Head SSW for 5.5 miles, the shore of Drummond Island fronting False Detour Channel is generally deep-to. The S shore of the island is broken, with numerous indentations and many offlying shoals and islands. The largest bays, from W to E, are Whitney Bay, Island Harbor, Huron Bay, and Big Shoal Cove. These natural harbors have depths of 24 to 40 feet, but because of numerous obstructions, they should not be entered in foggy weather or without local knowledge.

Whitney Bay, on the E side of Barbed Point, is separated from the lake by several islands with two deep channels, marked by private buoys, leading into the bay. Outside the islands in the approach to the bay, several shoals rise abruptly from deep water. The outermost is a rock, covered 7 feet, 0.9 mile S of **Bellevue Island** and marked on the SW side by a buoy. From the buoy a shoal bank extends 0.6 mile E. A 12-foot and a 14-foot spot are 0.5 and 0.8 mile NW of the buoy, respectively. A reef with rocks awash and a reef with rocks just below the surface are 0.4 mile S and SE of Bellevue Island, respectively.

A marina, about 1.2 miles N of Bellevue Island on the E side of Whitney Bay, had depths of 6 to 9 feet reported alongside in 1978. The marina provides gasoline, water, electricity, a launching ramp, a 4-ton fixed hoist, and hull and engine repairs.

Island Harbor, 3 miles SE of Barbed Point, is separated from Whitney Bay by **Point Anderson. Espanore Island,** 0.8 mile SE of Point Anderson, encloses Island Harbor on the SW. A 1-foot reef with scattered boulders is 0.8 mile NW of the SW end of Espanore Island with a 13-foot shoal between. A rocky ledge extends 0.7 mile S from the island, and a ledge with rocks awash that extends 0.4 mile E from the island narrows the entrance to Island Harbor to about 0.25 mile.

Huron Bay, 2.5 miles E of Island Harbor, has a deep entrance about 0.4 mile wide on the E side of **Gravel Island.** A ledge with rocks awash extends 0.7 mile S from the E side of the bay. A rocky ledge with depths of 1 to 4 feet extends 0.7 mile S from Gravel Island.

From Huron Bay E for 7 miles to Big Shoal Cove, the shore is bordered by shoals extending about 0.5 mile off. **Holdridge Shoal,** a detached shoal with a least depth of 5 feet, is 2 miles SE of Gravel Island.

Scammon Cove, just NW of Big Shoal Cove, is enclosed between **Meade Island** on the W and **Scammon Point** on the SE. **Horseshoe Reef,** awash, is 1.3 miles SW of Meade Island. A large shoal with a least depth of 8 feet is between Meade Island and Horseshoe Reef.

Big Shoal Cove, on the E side of Scammon Point, provides good anchorage in 24 to 30 feet, clay bottom. Detached 4-foot and 6-foot shoals, 0.4 mile SE and 0.65 mile ESE of Scammon Point, respectively, are dangerous obstructions in the entrance to the cove. A rocky ledge, with some rocks uncovered, extends 1.5 miles SSW from the E side of the cove entrance. **Big Shoal**, the outer end of the ledge, expands to a width of 1.2 miles. The SW end of the ledge is marked by a buoy.

From Big Shoal Cove E for 4 miles to False Detour Channel, the shore of Drummond Island should be given a berth of 1.5 miles.

The **International boundary** between the United States and Canada passes through False Detour Channel, around the N side of Drummond Island through North Channel, and around the S side of St. Joseph Island into the St. Marys River.

False Detour Channel, a deep wide passage, leads between the E end of Drummond Island and the W end of Cockburn Island from Lake Huron to North Channel. A rock, covered 9 feet, 0.7 mile SW of the SE point of Drummond Island should be avoided in approaching the passage.

Charts *2297, *2295.–Cockburn Island, just E of Drummond Island, lies between False Detour Channel on the W and Mississagi Strait on the E. The island is easily distinguished by 480-foot-high **McQuaigs Hill** near the center of the island.

The W side of Cockburn Island, fronting on False Detour Channel, is generally clear and deep-to except at the SW end of the island. **Wheeler Reef**, about 5 feet high, and an 18-foot spot 0.5 mile SSW of the reef, are the outermost dangers on the E side of the entrance to False Detour Channel. **Kitchener Island** is just NE of Wheeler Reef, with a 20-foot channel between. Shoals extend about 0.25 mile W and N from the island into False Detour Channel. Good anchorage in 18 to 30 feet with protection from all winds is on the NE side of Kitchener Island, between it and **Herschell Island**.

Monk Point, the NW point of Cockburn Island, is marked by a light. From Monk Point to **Thompson Point**, the northernmost point of the island, the shore is deep-to. **Pitman Bank**, with depths of about 16 feet, extends 1 mile E from Thompson Point.

Tolsma Bay, a broad bight SE of Thompson Point, provides anchorage in the SW part in depths of about 40 to 50 feet, sand and mud bottom.

Cockburn Island, Ont., also known as **Tolsmaville**, is a village with two Government wharves at the head of Tolsma Bay. The W wharf, marked on the outer end by a light, extends 510 feet N from shore with reported depths of 8 to 18 feet at the outer end. The preferable berth is on the W side. When approaching this wharf, vessels should keep well out in deep water until the wharf is end on, then steer directly for it. N gales cause considerable sea at this wharf. About 500 feet E, a breakwater-wharf, marked on the outer end by a light, extends 536 feet NE from shore with depths of 17 feet along the outer end. A **169°** unlighted range marks the approach to the wharf. Vessels may berth along either side of the wharf, with the S side affording safe berthage in all winds. In 1983, depths of 6 to 10 feet were reported inside the breakwater-wharf.

Robinson Bay, 1.5 miles E of Tolsma Bay, is separated from it by **Ross Point**. The bay provides anchorage in 24 to 36 feet, sand bottom.

Channel Point (45°57.5'N., 83°16.1'W.), the NE point of Cockburn Island, is the W entrance point to Mississagi Strait from North Channel. From Channel Point S for 3.2 miles to **Cinder Point**, the E shore of the island is a high bluff with deep water close-to.

From Cinder Point SW for 6 miles to **Boom Point** (45°51.1'N., 83°21.4'W.), the southernmost point of the island, numerous off-lying shoals are along the W side of Mississagi Strait. A 16-foot spot is 0.7 mile S of Cinder Point, and a rock covered 16 feet is about 1 mile SSE of the point in about 45°53'47"N., 83°15'48"W. **Castilian Shoal**, almost awash, is 1.2 miles offshore, 3.7 miles ENE of Boom Point. A 25-foot shoal 0.7 mile NE of Castilian Shoal is marked on the E side by a buoy. **Magnetic Reefs** extend 2.4 miles SE from Boom Point. The most dangerous of these are **South Reef**, with a least depth of 7 feet, and **East Reef**, awash. **West Reef**, **Middle Reef**, and **North Reef** are inshore of these. A rock covered 23 feet is about 2.3 miles SSE of Boom Point in about 45°49'07"N., 83°20'37"W. Mariners should give Boom Point a berth of at least 3 miles.

From Boom Point NW for 4.4 miles to **Pulpwood Point**, shoals extend about 0.3 mile offshore. A shoal with depths 9 feet and less extends 0.4 miles S from Pulpwood Point. **McKay Rock**, covered 10 feet, is 0.8 mile SSW of the point.

Wagosh Bay opens S between Pulpwood Point and **Smith Point**, 2 miles W. **Wagosh Reef**, with a depth of 5 feet near the outer end, extends about 1 mile S from shore into the center of the bay. Shoals extend about 0.4 mile off the E and S sides of Smith Point. Excellent anchorage with protection from W winds is between Wagosh Reef and the shoals off the E side of Smith Point in 18 to 30 feet, sand and mud bottom.

Mississagi Strait is a deep wide passage leading between Cockburn Island and Manitoulin Island from Lake Huron to North Channel.

Charts 14860, *2200.–Manitoulin Island is about 80 miles long E and W and has a general width that increases from about 6 miles at its W end to about 30 miles near its E end, but large bays that indent the island constrict the width in places to less than 3 miles. The S shore of the island fronting Lake Huron extends from Mississagi Strait SE to the Owen Channel entrance to Georgian Bay, its E shore fronts on Georgian Bay, and its deeply indented N side forms the major part of the S shore of North Channel.

Chart *2297.–The rounding W end of Manitoulin Island, fronting on Mississagi Strait, is bold and deep-to. **Mississagi Strait Light** (45°53.6'N., 83°13.5'W.), 64 feet above the water, is shown from a square skeleton tower with a red and white rectangular daymark on the E side of the S entrance to the strait.

The S shore of Manitoulin Island is generally a series of small points with small bays between and bordered by a shoal bank and numerous detached shoals. The five Duck Islands and their surrounding shoals extend about 14 miles S offshore from near the W end of the island.

Carter Rock, awash, is on the N end of a detached reef at the E entrance to Mississagi Strait, 1.2 miles SW of **Lynn Point** (45°51.8'N., 83°10.2'W.) and 3.1 miles SSE of Mississagi Strait Light. **Purvis Bank,** awash, extends 1 mile SE from Lynn Point.

Greene Island Harbour, 3.5 miles E of Lynn Point, is an excellent harbor with protection from all winds and good anchorage in 24 to 36 feet close to the NE shore of **Greene Island,** which encloses the SW side of the bay. Reefs extend N from Greene Island to Manitoulin Island. A ledge with depths under 18 feet extends about 1 mile SE from the E point of Greene Island and narrows the entrance to Greene Island Harbour. **Labrador Reef,** with depths of about 5 feet, and **Jones Shoal,** with a least depth of 7 feet, are obstructions on the E side of the entrance to Greene Island Harbour about 1.7 and 2.2 miles SE of Greene Island, respectively. **Ainslie Shoal,** a rock covered 2 feet, is 0.5 mile S of **Girouard Point** (45°49.8'N., 83°00.5'W.), 4.7 miles E of Greene Island. A shoal with a least depth of 17 feet is 0.9 mile SW of Girouard Point.

Burnt Island Harbour, protected on the SE side by **Burnt Island,** 2.8 miles E of Girouard Point, affords good anchorage with protection from all but W winds in depths of 18 to 30 feet, mud bottom. **Stafford Rock,** covered 5 feet, is 1 mile SW of Burnt Island. A 17-foot spot is 0.5 mile SW of the rock.

Western Duck Island, 3 miles SSW of Burnt Island, is surrounded by submerged rocks and shoals to about 0.5 mile offshore, except on the N side where depths to 9 feet extend 1 mile offshore. **Western Duck Reef,** 1.5 miles NW of the island, has a least depth of 5 feet.

Inner Duck Island, 2.7 miles SSE of Burnt Island, is connected N to Manitoulin Island by a narrow shoal with submerged rocks covered less than 6 feet. **Thibault Shoal,** midway between the islands, is the shoalest part. A shoal with a depth of 15 feet at the outer end extends 0.7 mile S from Inner Duck Island. **Macauley Spit,** with a depth of 9 feet at the outer end, extends 0.8 mile SE from the island.

Middle Duck Island, 3 miles S of Inner Duck Island, has shoals extending 0.8 mile N and S. The N shoal has a depth of 5 feet at the outer end. **Kipling Reef,** with rocks covered less than 6 feet, is at the outer end of a bank that extends 0.7 mile W from Middle Duck Island.

Great Duck Island is a thickly wooded island 1.3 miles SW of Middle Duck Island. **Great Duck Island Light** (45°38.5'N., 82°57.8'W.), 108 feet above the water, is shown from a white octagonal tower on the SW side of the island; a fog signal and a radiobeacon are at the light. A 423-foot radio tower is near the light. **Outer Duck Island** parallels the SE shore of Great Duck Island and is connected to it by a shoal with depths of 13 feet and less. **Bain Rock,** covered less than 6 feet, is near the middle of the shoal. The narrow channel between the islands provides anchorage for small craft with protection available from all winds. Protection from S winds is provided by a visible wreck off the fishing wharf on the SE side of Great Duck Island. Deep-draft vessels can find protection from W winds N of Outer Duck Island in depths of 18 to 60 feet, sand and clay bottom, but the swell can be heavy.

Local magnetic disturbance.–Differences from normal variation of up to 8° have been observed about 9 miles SSW of Great Duck Island.

Manitoba Reef, 3 feet high, is 0.5 mile off the N shore of Great Duck Island. **Horseshoe Bay,** on the W side of the island, is shallow and boulder-strewn, and usable only by small craft. Several shoals reach 2.2 miles S from Great Duck Island. **Mary Shoal,** 0.5 mile S, has a least depth of 7 feet. **Kitty Shoal,** 1.2 miles S of the island, has a least depth of 9 feet, and **Larry Rock,** just W, is covered 11 feet. **Jennie Graham Shoal,** with a least depth of 5 feet, is 2 miles S of the island. A shoal with submerged rocks and a depth of 11 feet at the outer end extends 1.4 miles S from Outer Duck Island.

Chart *2298.–Carroll Wood Bay, between **Walkhouse Point** (45°47.0'N., 82°52.1'W.) and **Goose Point** 2.5 miles E, is generally shallow and obstructed by several shoals. **Gaspesia Shoal,** with a least depth of 14 feet, and several spots with depths of 19 to 21 feet, are within 0.6 mile E to SSE of Walkhouse Point. **Seaman Reef,** with a least depth of 8 feet, is 1.2 miles NE of the point. **Morrell Reef,** with a least depth of 4 feet, is 0.7 mile W of Goose Point. Shoals and submerged rocks extend 0.7 mile SE from Goose Point.

The bays along the remainder of the S shore of Manitoulin Island form harbors of refuge for small craft in heavy weather from NW to NE. Strangers should exercise due caution when entering any of these bays because of many outlying dangers.

Hensley Bay, 1.3 miles E of Goose Point, affords anchorage in depths of 24 feet, sand and stone bottom. **Buller Reef,** a cluster of rocks awash, is on the W side of the bay entrance. A shoal with depths of 13 to 16 feet extends 0.9 mile S from the reef. At **Misery Point,** on the E side of the bay, shoals extend 0.8 mile SW. **Methuen Reef,** covered 4 feet, is at the outer end of the shoals.

Misery Bay, on the E side of Misery Point, has anchorage in the center in 12 feet, sand and mud bottom. **Taylor Reef,** with a least depth of 11 feet, extends about 1.6 miles S from the middle of the bay entrance. **Saunders Reef,** covered 4 feet, is 0.5 mile E of Taylor Reef.

From Misery Bay, the shore rounds E for 1.7 miles to **Frechette Point. Frechette Bank,** covered 4 feet, is 0.8 mile S of the point, with shoals and submerged rocks between. Detached 13- to 17-foot spots are about 0.5 mile S of the bank. **Frechette Bay,** on the E side of Frechette Point, is very shallow.

Murphy Point (45°46.7'N., 82°41.1'W.) separates the E side of Frechette Bay from Murphy Harbour. **Murphy Harbour** affords anchorage for small craft in depths of 7 feet on the NW side of the islet in the center of the harbor. Craft enter the harbor SE of the islet in depths of 5 feet.

From Murphy Harbour SE for 2.2 miles to **Gatacre Point,** the shore should be given a berth of 0.8 mile. **Shamrock Bank,** with a least depth of 4 feet, extends 1.1 miles SW from shore about 2 miles E of Gatacre Point. E for 2.3 miles to **Portage Point,** shoals extend 0.6 mile offshore. **Portage Bay,** on the E side of Portage Point, is unsuitable for anchorage, and its shores are foul. **Thistle Reef,** with a least depth of about 5 feet, extends about 1.5 miles S from the E side of Portage Bay.

Srigley Bay, 2 miles E of Thistle Reef, on the NW side of **Melville Point** (45°42.5'N., 82°28.9'W.), has excellent anchorage in depths of about 27 feet, sand bottom.

From Melville Point SE for 2.8 miles to **Dominion Point,** shoals extend 0.5 mile offshore. Detached 13- and 16-foot spots are 1.2 and 0.8 miles SW of Dominion Point, respectively. **Dominion Bay,** on the E side of Dominion Point, has good anchorage in 30 feet, sand bottom.

Between Dominion Point and **Mutchmore Point,** 5.7 miles SE, the shore is indented by several small bays. **Square Bay, Lougheed Bay, Lonely Bay,** and **Dean Bay** provide protection from N winds in depths of 12 to 18 feet. **Lougheed Reef,** with depths of 10 feet, extends 0.7 mile SW from **Lougheed Point. Milton Reef,** with a least depth of 4 feet, extends 0.8 mile SW from **Milton Point. Dean Spit,** with a depth of 10 feet at the outer end, extends 0.6 mile SW from the point on the W side of Dean Bay. Detached spots with depths of 4 to 11 feet extend SW through the center of Dean Bay.

From Mutchmore Point SE for 1.5 miles to **Simcoe Point,** shallow boulders and shoals extend to 0.7 mile from shore. **Simcoe Bank,** with a depth of 10 feet at the outer end, extends 0.7 mile S from Simcoe Point.

Providence Bay, between Simcoe Point on the W and **Providence Point** on the E, is the first important indentation E of the Duck Islands. **Providence Bay Light** (45°39.1'N., 82°16.5'W.), 47 feet above the water, is shown from a skeleton tower with red and white horizontally striped daymarks on the E side of the entrance to the bay. A Government wharf, marked by a light on the E side of the bay, was in disrepair in 1976. In 1954, the buoyed approach channel to the wharf had a controlling depth of 16 feet. Water, gasoline, some supplies, and a launching ramp are available. Fish piers on the E side of the wharf have depths of 6 feet alongside. Excellent anchorage is in the bay in depths of 10 to 22 feet, sand over clay bottom.

From Providence Point E for 2.7 miles to **Timber Bay,** shoals and rocks awash extend 0.7 mile offshore. **Everett Reefs** are a group of bare rocks about 0.5 mile offshore. **Timber Bay Shoal,** 3 feet high, is 0.8 mile SW of the E point of Timber Bay. A 7-foot spot is 0.6 mile offshore S of the point.

Between **Jenkins Point** (45°36.7'N., 82°11.8'W.) and **Rathbun Point** 1.7 miles E, reefs and rocky ledges render navigation within 1 mile of shore unsafe. **Buckeye Shoal,** with a rock awash at the E end, is 0.9 mile S of Jenkins Point. A 21-foot spot is 2.1 miles SSW of Jenkins Point. A shoal, with a depth of 10 feet at the outer end, extends 0.5 mile S of Rathbun Point.

Michael Bay, 4.5 miles E of Jenkins Point, is enclosed by **Hammond Point** on the N and **Michael Point** on the S. The bay, open to the W, has good anchorage in the S part in depths of 18 to 30 feet, clay bottom. **Chisholm Shoal,** covered 3 feet, is on the N side of the bay. A shoal with depths of 8 feet extends 0.8 mile W of Michael Point. **Advance Reef,** with depths less than 6 feet, is 1.5 miles W of Michael Point. Vessels entering Michael Bay should pass W and N of the reef.

Reefs that extend 1.2 miles from shore obstruct the bight on the SE side of Michael Point. **Genesta Bank,** with a least depth of about 5 feet, is 1.5 miles SE of Michael Point.

From **Walker Point,** 3.2 miles SE of Michael Point, E for 2.7 miles to the mouth of South Bay, reefs extend about 0.3 mile from shore. **Volunteer Spit,** 0.7 mile SE of Walker Point, has a least depth of 10 feet. **Red Dan Rock,** nearly awash, is 0.3 mile offshore 1.4 miles E of Walker Point.

Charts *2298, *2273.–South Bay, entered between Scotchie Reef on the W and **McGaw Point** on the E, extends about 15 miles NE into the SE shore of Manitoulin Island. **Scotchie Reef,** with depths of 1 to 8 feet, and **Inkster Rock,** covered 3 feet just SE, are marked on the SE side by a lighted buoy. Buoys mark the extent of shoals around McGaw Point. **Wallace Rock,** with a least depth of 11 feet, is on the E side of the approach to South Bay, 1 mile SSW of McGaw Point. A lighted bell buoy is SW of Wallace Rock on the entrance range line into South Bay.

The entrance to South Bay has a controlling depth of about 20 feet and is marked by lighted and unlighted buoys and a **024°50'** lighted range. A fog signal is at the front range light. When approaching the bay, the range should be brought into line not less than 2 miles from the entrance. A current sets out of South Bay except during strong onshore winds.

South Bay has depths of 24 feet or more, generally within 0.2 mile of shore except at the head. **Glycerine Rock,** covered 2 feet, is 0.7 mile off the SE shore of the bay 4.3 miles from the head. Good anchorage with protection from all winds is available in depths of 24 to 40 feet, mud bottom.

South Baymouth, Ont., is a small village on the NW side of the entrance to South Bay. A ferry operates from the village to Tobermory, Ont., on the SE side of the entrance to Georgian Bay. A small-craft basin SW of the ferry terminal has depths of 5 feet alongside the docks. Gasoline is available. An overhead power cable with a clearance of 25 feet crosses the basin.

Chart *2298.–Thomas Bay, 3.5 miles E of South Bay, has good anchorage with protection from all but S winds in depths of 18 to 40 feet, mud bottom.

A ledge with depths less than 6 feet extends 0.4 mile S from **Thomas Point** on the W side of the bay entrance. **Todman Reef,** with a least depth of 2 feet, is in the middle of the bay entrance. **Mayflower Island,** a small island on the E side of the entrance, has a ledge with a least depth of 4 feet extending SW from it. **Grantham Shoal,** with a least depth of 2 feet, and **Vigilant Rock,** with a least depth of 6 feet, are 0.7 mile S and 1.1 miles SE of Mayflower Island, respectively.

The shore should be given a berth of 1.3 miles from Thomas Bay SE to **Hungerford Point,** the SE point of Manitoulin Island.

Charts 14860, *2286, *2252, *2297, *2295.–The N shore of Manitoulin Island, fronting on North Channel, is indented by large, deep bays, all affording good anchorage and protection, but most are exposed to N winds. The largest bays are Smith Bay, Manitowaning Bay, Sheguiandah Bay, West Bay, Mudge Bay, Gore Bay, Julia Bay, Bayfield Sound, Vidal Bay, and Meldrum Bay. A detailed description of the N shore is given in Canadian Sailing Directions, Great Lakes, Volume II, published by the Canadian Hydrographic Service and sold by the Hydrographic Chart Distribution Office. (See appendix for addresses.)

Charts *2286, *2245.–Smith Bay, at the NE end of Manitoulin Island, is enclosed on the E by **Cape Smith** (45°48.2'N., 81°35.2'W.). Several dangers are in the entrance to the bay. **Goldhunter Rock,** covered 1 foot, is 1.1 miles NW of Cape Smith. **Doyle Rock,** covered 18 feet, is in the center of the entrance, 2.2 miles WNW of the cape. **Frank Ledge,** on the N side of the entrance, has rocks covered about 2 feet. Good anchorage is near the head of the bay in depths of 25 feet, mud bottom, with protection from all but NE to E winds, but the bay is too open to provide comfortable anchorage for small craft. **Wekwemikong, Ont.,** at the head of the bay, has a Government wharf with the outer end submerged ruins. An obstruction off the end of the wharf is marked by buoys. Gasoline is available nearby, and diesel fuel is available by truck.

Manitowaning Bay, W of Smith Bay, is a clear deep bay extending 11 miles S into the shoreline. **Five Fathom Patch,** covered 26 feet near the middle of the bay mouth, is the only outlying danger. **Manitowaning, Ont.,** a village on the W side near the head of the bay, has a Government wharf. Gasoline is available nearby, and diesel fuel is available by truck. A light is in the village, just N of the wharf. Good anchorage is S of the wharf in depths of 18 to 30 feet, mud bottom.

Charts *2286, *2205.–Sheguiandah Bay opens on the W side of the mouth of Manitowaning Bay, with **Strawberry Island** enclosing it on the N. A **261°30'** lighted range at the head of the bay marks the entrance from E. Several dangers are in the approach to the bay on the S side of the rangeline. **Loon Island Reef,** the easternmost, is covered 2 feet and marked on the NE side by a buoy. **Loon Island,** low and wooded, is 1 mile W of the reef. **McGregor Bank,** is covered 4 feet, and **Boulton Reef** is covered 4 feet close S of the rangeline. **King William Island** is on a shallow bar that extends 0.7 mile N from shore about 2.5 miles from the head of the bay. **Leech Reef,** 0.7 mile W of King William Island, extends 0.7 mile N from shore.

Caution.–Vessels should keep S of the rangeline when within 0.3 mile of the front light to avoid shoals off **O'Meara Point.**

Sheguiandah, Ont., a village on the N side at the head of the bay, has a Government wharf with a depth of 7 feet alongside. Marinas at the village provide berths, gasoline, water, ice, electricity, marine hardware, launching ramps, and hull and engine repairs.

Strawberry Channel, the N entrance to Sheguiandah Bay, leads between Manitoulin Island and the W side of Strawberry Island. A depth of about 14 feet can be carried through the channel, but local knowledge is advised because it is unmarked and shoals border each side.

Charts *2286, *2205, *2294.–Little Current, 20 miles NW of Cape Smith, is a narrow constriction of North Channel between Manitoulin Island and the S side of **Goat Island.** The channel through Little Current, well marked by lighted and unlighted buoys, has a controlling depth of about 20 feet. The E approach to the channel is marked by a **259°05'** lighted range and thence a **319°** lighted range.

Caution.–With strong currents, the buoys in Little Current are sometimes towed under.

Masters of vessels entering or leaving Little Current should give a **safety call** on VHF-FM channel 16 (156.80 MHz) giving the vessel's position and intentions.

Bridge.–A highway swing bridge with a clearance of 18 feet crosses the channel. The opening signal for the bridge is three long blasts of the whistle. The bridgetender will sound one long and one short blast when the bridge is open and clear for traffic, or five short blasts if the bridge cannot be opened immediately. Vessels shall pass to starboard of the center pier.

Currents.–There is almost always a current in Little Current channel, varying in rate according to wind and atmospheric pressure conditions. The current is strongest at the bridge, and the rates given below are for that location.

In the absence of wind and atmospheric pressure disturbances, the current normally fluctuates from 0 to 2 knots and may reverse its direction several times during a 24-hour period. A strong wind from the E or W causes a current flow in the direction of the wind roughly proportional to wind speed, a 4-knot current corresponding to a 27-knot wind, and a 7-knot current corresponding to a 42-knot wind.

To maintain steerageway it is advisable to negotiate the channel on an opposing current or at slack water. Sufficient power and considerable care are required, particularly at the bridge and in the sharply curved W entrance channel.

Caution.–The pier that supports the swing span when it is open does not lie parallel to the axis of the current, thus a master must allow for current about 15° on the bow.

Little Current, Ont., a town on the S side of Little Current, is a **Canadian customs port of entry.**

Wharves.–Canadian Pacific Railway loads iron ore pellets at a 1,570-foot wharf on the S side of Goat Island. The wharf has a reported controlling depth of 18 feet alongside. A ship-loader operates at 3,000 tons per hour. Water and electrical shore-power connections are available.

The 280-foot Government wharf on Manitoulin Island opposite the W end of Goat Island has depths of about 22 feet in the middle part.

Small-craft facilities.–Berths with electricity, gasoline, diesel fuel, water, ice, and sewage pump-out facilities are available at the Government wharf. Marinas at Little Current provide gasoline, diesel fuel, ice, marine supplies, sewage pump-out, and a 10-ton lift and marine railways to 70 tons for hull and engine repairs.

Charts *2286, *2252, *2257.–West Bay, just W of Little Current, is about 6 miles wide at the entrance between **Francis Point** on the W and **Wabos Island** on the E. **McRae Patch,** a group of detached spots with depths of 12 to 28 feet, is 1 mile NE of Francis Point. **James Foote Patch, Foster Bank,** and **Eleven Foot Rock** are a group of shoals 2 miles N of Wabos Island. They have a least depth of 1 foot and are marked on the S side by a lighted buoy. Except for these dangers, the bay is deep and clear for 8 miles to its head. Good anchorage is at the head of the bay in depths of 36 to 48 feet, mud bottom. A Government wharf at the head of the bay has depths of 14 feet alongside. **Sounding Cove,** on the E side of West Bay, has anchorage with protection from N gales in depths of 30 to 42 feet, mud bottom; vessels should not approach within 0.2 mile of the N shore of the cove.

Charts *2252, *2257.–Mudge Bay, just W of West Bay, is 2.6 miles wide at the entrance between **Trudeau (Gooseberry) Island** and **Maple Point** and extends about 3 miles S. **Little Island Bank,** with depths of 1 to 4 feet and a spot awash at the E end, extends 1 mile E from Maple Point. **McInnes Bank,** 0.8 mile NW of Trudeau Island, has a least depth of 9 feet and is marked at the N end by a buoy. **Sutherland Shoal,** 1 mile NW of McInnes Bank, has a least depth of 12 feet. Mudge Bay has good anchorage in depths of 36 to 48 feet, mud bottom. **Kagawong, Ont.,** at the head of the bay, has an L-shaped Government wharf that provides good protection on the SE side. In 1983, depths of 17 feet were reported along the outer face of the wharf, with 6 to 10 feet alongside the berths in the basin. Gasoline, diesel fuel by truck, electricity, water, ice, sewage pump-out facilities, a launching ramp, and engine repairs are available.

Clapperton Channel separates **Clapperton Island** and **Vankoughnet Island** from Manitoulin Island, and extends W from Francis Point to Maple Point. The W part of the channel is buoyed and has a controlling depth of about 9 feet, but depths of 5 to 6 feet are very close N and S of the channel.

Clapperton Harbour, on the S side of Clapperton Island, is an excellent anchorage and offers shelter from the heaviest gales. **Harbour Island,** in the center of Clapperton Harbour, is wooded. The best anchorage is NE of Harbour Island in depths of about 26 feet, clay bottom. Transient berths with electricity and water are available on the NE side of the Harbour Island. Depths of 4 to 6 feet are reported alongside.

Gore Bay, 7 miles W of Mudge Bay, is 1.3 miles wide at the entrance and narrows gradually for 1.7 miles to its head. **Gore Bay Light** (45°56.8'N., 82°28.8'W.), 46 feet above the water, is shown from a white pyramidal tower on **Janet Head** on the W side of the bay entrance. The bay has good anchorage in depths of 24 to 60 feet, mud bottom. **Gore Bay, Ont.,** is a village on the W side at the head of the bay. A **189°09'** lighted range at the head of the bay marks the approach to the village. **Town Point,** marked by a buoy, extends E from shore at the village and provides shelter for several wharves on its S side. Depths of 6 to 16 feet are available at the wharves. Gasoline, diesel fuel, water, electricity, sewage pump-out facilities, marine supplies, a 5-ton lift, and a launching ramp are available. Gore Bay is a **Canadian customs vessel reporting station.**

Julia Bay is a deep, square indentation W of Gore Bay, between **Janet Head** and **Blackstock Point.** The bay extends 2.3 miles S and has depths to 120 feet within 0.2 mile of its head. It is unsuitable for anchorage because of its depth and exposure to N winds.

Charts *2252, *2258.–Bayfield Sound, entered about 14 miles W of Gore Bay, is a large inlet enclosed on the N side by **Barrie Island,** which is connected by a causeway at its E end to Manitoulin Island. **Cape Robert** (45°59.8'N., 82°48.6'W.), on the W side of the entrance to the bay, is marked by a light. **Jubilee Shoal,** awash, and **Heron Patch,** with a least depth of 13 feet, are about 1.7 miles NW of Barrie Island in the entrance to the sound. **Gertrude Island, Fanny Island,** and **Henry Island** are on a very shallow bank W of Barrie Island in the entrance to the sound. **Henry Island Sandbank** extends S from Henry Island and connects with Manitoulin Island. A buoy 0.5 mile E of Fanny Island marks the E side of shoal bank and the W side of the deep water leading into the main part of the sound. Vessels may anchor about 0.7 mile E of the SE point of Henry Island in depths of about 36 feet, mud bottom, but this anchorage offers little shelter. A marina at the S end of **Campbell Bay** at the E end of the sound provides transient berths, gasoline, diesel fuel by truck, water, electricity, and sewage pump-out. In 1983, depths of 6 to 8 feet were reported alongside the docks.

Cook Bay is a small inlet on the SW side of Bayfield Sound. The approach to the bay, marked by buoys, is between the W side of Henry Island Sandbank and the E side of **Henry Patch.** A Government wharf with depths of 10 feet at the outer end is on the SE side of the bay. **Battery Bluff Anchorage,** just E of the bay entrance, has depths of 16 feet with good holding ground.

Vidal Bay, 9 miles SW of Cape Robert, is a broad indentation enclosed on the N by **Vidal Island.** The entrance to the bay, E of Vidal Island, has a controlling depth of about 11 feet between the shoal borders, but greater depths can be carried with local knowledge. Excellent anchorage is in the SW part of the bay in depths of 25 feet, sand and clay bottom. Anchorage with protection from N winds is 0.3 mile S of the middle of Vidal Island in depths of 9 feet.

A very shallow reef extends 2.4 miles W from the W end of Vidal Island to Batture Island on the E side of the entrance to Meldrum Bay. There is no passage for vessels over the reef, but small craft transiting between Vidal and Meldrum Bays may pass S of the reef.

Charts *2295, *2252.–Meldrum Bay, the westernmost indentation on the N shore of Manitoulin Island, is 4 miles wide between **Chamberlain Point** and **Brittomart Point. Batture Island,** marked on the N side by a light, is on the E side of the entrance, 1 mile NW of Chamberlain Point. Vessels entering the bay from North Channel must pass W of Batture Island to avoid the shallow reef that extends E to Vidal Island. **Meldrum Bay, Ont.,** on the SW side of the bay, has a Government wharf with depths of 6, 17, and 6 feet along the N, E, and S faces, respectively. A light marks the end of the wharf. Small-craft piers, with depths of 5 to 9 feet alongside, extend S from the Government wharf. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, and engine repairs are available. Meldrum Bay is a **Canadian customs vessel reporting station.** Anchorage S and SE of the Government wharf has excellent protection from W winds in depths of 30 to 60 feet.

Meldrum Point (45°57.5'N., 83°09.8'W.) is the N end of the rounding W end of Manitoulin Island and is on the E side of the North Channel entrance to Mississagi Strait.

Charts 14860, *2235, *2245.–Georgian Bay is entered from Lake Huron between **Hungerford Point** on the SE end of Manitoulin Island and **Cape Hurd** 16 miles SSE on the NW side of **Bruce Peninsula.** Numerous islands and shoals obstruct the entrance, and several channels lead between into the bay. It is reported that currents up to 7 mph (6 knots) may occur following changes of wind direction in the channels between Fitzwilliam Island and Bruce Peninsula.

Owen Channel, about 1 mile wide, separates the SE side of Manitoulin Island from the NW side of **Fitzwilliam Island. Ship Bank,** with a least depth of 6 feet, is on the S side of the channel, 0.7 mile NW of **Phoebe Point,** the NW point of Fitzwilliam Island. **Stewart Rock,** covered 1 foot, is 0.5 mile N of Phoebe Point. **The Ridge,** with a least depth of 6 feet and prevailing depths of 9 to 18 feet, connects the islands near midlength of Owen Channel. **Owen Island** is connected to Manitoulin Island on the N side of the channel. **Owen Island Bank,** with depths to 9 feet, extends off around Owen Island.

The W end of Fitzwilliam Island is bordered by depths less than 18 feet and by rocks, awash and submerged, for a distance of about 1 mile offshore. **Little Rock,** covered 10 feet, is 0.9 mile SW of Phoebe Point. A 13-foot spot is just NW of Little Rock. **Perseverance Island** is near the outer edge of the shoal border, 1.9 miles SSW of Phoebe Point. **Emily Maxwell Reef,** an extensive rocky ledge with a least depth of 2 feet, extends 1.2 miles SW from near the SW end of the island.

Rattlesnake Harbor is on the N side of Fitzwilliam Island, 0.6 mile SW of **Northeast Point.** The harbor, protected on the N by **Rattlesnake Point** and on the W by **Little Island,** has good anchorage with protection from all winds in depths of 12 to 21 feet, mud bottom.

Caution.–A deadhead, covered 2 feet, is about 0.2 mile ENE from Rattlesnake Point.

The area between the S end of Little Island and Fitzwilliam Island is foul. Shoals extend 0.2 mile NE from Little Island, 0.1 mile W from Rattlesnake Point, and about 200 feet offshore around the harbor.

Wall Island, marked on the E side by a light, is 1 mile N of Northeast Point of Fitzwilliam Island. Shoals and submerged rocks extend 1 mile S and 0.3 mile W from the island. **Pope Rock,** covered 20 feet, is 1.8 miles W of Wall Island.

Club Island, 4.8 miles NE of Fitzwilliam Island, has shoals extending 0.5 mile off the SW shore. **Club Harbour,** an inlet on the E side of the island, has limited anchorage with reported poor holding ground in depths of 9 to 15 feet; rock, gravel, and mud bottom. E winds cause a surge in the harbor. The entrance to the harbor is obstructed by two rock ledges, North Reef and South Spit, with a depth of about 8 feet between.

Erie Bank, marked on the W side by a buoy, is just W of Club Island, with **Erie Channel** between. The bank has depths of 3 to 18 feet and a small island at the N end.

Fitzwilliam Channel leads between Fitzwilliam Island on the NW and **Yeo Island** and **James Island** on the SE. **Indian Harbour Reef,** with depths of 2 to 18 feet, extends 1 mile SW from **Indian Harbour Point,** the SW point of Fitzwilliam Island. **McLelan Rock,** covered 7 feet, is a dangerous obstruction 1.2 miles SSW of Indian Harbour Point. **Smith Rock,** covered 14 feet, is 1.5 miles S of the point. A 15-foot spot is 0.4 mile SW of Smith Rock. **Manitoba Ledge,** with several rocks awash, is on the S side of Fitzwilliam Channel, just W of Yeo Island. The channel between the island and ledge should not be attempted without local knowledge.

James Island is on the SE side of Fitzwilliam

Channel 2 miles NE of Yeo Island. **James Reef,** with depths less than 6 feet, extends 1 mile SW from the island. **McCarthy Point Ledge,** with a depth of 8 feet at the outer end, is a broad ledge that extends 2.1 miles SSW from **McCarthy Point,** about midlength of the SE side of Fitzwilliam Island, to within about 0.6 mile of James Reef. **Kilroy Patch,** covered 24 feet, is 5.3 miles NE of James Island.

Yeo Channel leads between Yeo Island on the N and **Lucas Island,** marked by a light, on the S. A buoy marks the edge of the shoals on the SE side of Yeo Island, and a lighted buoy marks the E side of a 26-foot spot 0.4 mile W of Lucas Island. **Fagan Ground,** covered 13 feet, is 0.9 mile W of Lucas Island.

Main Channel leads into Georgian Bay between Lucas Island and **Cove Island,** 4.6 miles S. **Cove Island Light** (45°19.6′N., 81°44.1′W.), 101 feet above the water, is shown from a white circular structure on **Gig Point,** the NE point of Cove Island; a fog signal and a radiobeacon are at the light. The light marks the S side of Main Channel. A lighted bell buoy 5.5 miles W of the light marks the W approach to the channel.

West Sister, a rocky patch covered 14 feet, is marked on the N side by a lighted buoy 3.9 miles NW of Cove Island Light. **East Sister,** covered 16 feet, is 0.5 mile SE of West Sister. **Bad Neighbour Rock,** awash, is 2.9 miles NNW of Cove Island Light. Depths of 5 to 9 feet extend 0.25 mile S from the rock and are marked on the SW side by a buoy. The rock is very dangerous, especially when approached from S or E in thick weather or at night, as it makes up quickly from very deep water. **O'Brien Patch,** with a least depth of 18 feet, is marked by a lighted bell buoy 2.2 miles NW of Cove Island Light.

Great Barrier is a line of reefs, separated from each other by narrow deepwater channels, that extends from a point about 1.3 miles E of Lucas Island SE for about 7.2 miles to just beyond **Snake Island.** A deep channel leads between Snake Island and **Flowerpot Island,** 2 miles S. **Flowerpot Island Light** (45°18.4′N., 81°36.8′W.), 91 feet above the water, is shown from a white tower on the NE side of the island; a fog signal is at the light. **McElhinney Ground,** with a least depth of 26 feet, is 0.8 mile NW of the light and is marked on the W side by a lighted buoy.

Bears Rump Island is 1.7 miles E of Flowerpot Island. **Bears Rump Shoal,** marked at the outer edge by a lighted buoy, extends 0.3 mile SW from the island.

Charts *2235, *2274.–The entrance to Georgian Bay between the S end of Cove Island and Cape Hurd is much obstructed by shoals and small islands. **Turning Island,** marked by a light, is the southwesternmost of a group of small islands close off the SW shore of Cove Island. A broken line of shoals with depths of 2 to 18 feet extends about 0.8 mile W from Turning Island. **North Channel** is a narrow deep channel that leads through a break in the shoals about 0.4 mile W of the island. **Northwest Bank** is a large rocky bank with depths of 2 to 18 feet from about 0.9 to 2.3 miles W of Turning Island. **Greenfield Shoal,** with a rock 1 foot high and another awash, is 0.4 mile S of Turning Island. **White Rock,** 7 feet high, is 0.2 mile W of Greenfield Shoal. **Middle Bank,** 1.7 miles SW of Turning Island, has a number of rocks as much as 3 feet high and depths of 3 to 18 feet over a wide area. **Southwest Bank,** 3 miles SW of Turning Island, has depths of 3 to 18 feet and is marked on the SE side by a buoy.

Cape Hurd (45°13.2′N., 81°43.8′W.), marked by a light, is the NW tip of the Bruce Peninsula, on the S side of the entrance to Georgian Bay from Lake Huron. **Southeast Bank,** centered about 1.3 miles N of Cape Hurd, has several rocks as much as 2 feet high and depths of 1 to 18 feet over a large area. A shoal with a least depth of 19 feet is marked on the W side by a buoy 1.3 miles NW of Cape Hurd. **Devil Island,** 2.3 miles N of Cape Hurd, is near the center of **Devil Island Bank.** The bank has numerous islets to 7 feet high and depths of 1 to 18 feet elsewhere. **The Spur,** with a least depth of 9 feet, extends 0.4 mile W from Devil Island and is marked on the outer edge by a buoy. **Earl Patches,** with depths of 1 to 6 feet, are at the E end of Devil Island Bank. **Russel Island** is at the NE end of Devil Island Bank. **Russel Reef,** with depths of 2 to 8 feet, extends 0.3 mile W from the island and is marked at the outer edge by a buoy.

Devil Island Channel, the best channel through the shoals between Cove Island and Cape Hurd, leads between Southwest Bank, Middle Bank, and Greenfield Shoal on the NW and Southeast Bank, The Spur, and Russel Reef on the SE. The entrance to the channel from Lake Huron is marked by a lighted buoy just S of Southwest Bank. The channel between the shoals is marked by buoys and a **040°25′** lighted range shown from **North Otter Island** and **South Otter Island,** two small islands close off the SE end of Cove Island.

Cape Hurd Channel, suitable only for shallow-draft vessels, is a narrow buoyed channel close to the Bruce Peninsula shore between Southeast Bank, Earl Patches, and Russel Island on the NW and the shoals off Cape Hurd and China Reef on the SE. **China Reef,** with several rocks 1 foot high, extends 0.7 mile SW from **Wreck Point,** 2.8 miles NE of Cape Hurd. The reef is marked by a buoy on the NW side.

Charts 14860, *2200, *2201.–**North Channel** and **Georgian Bay** are fully described in Canadian Sailing Directions, Great Lakes, Volume II, published by the Canadian Hydrographic Service and sold by the Hydrographic Chart Distribution Office. (See appendix for addresses.)

Aside from the N shore of Drummond, Cockburn, and Manitoulin Islands, previously described, no detailed treatment of these waters is here attempted. The following are descriptions of some of the localities in St. Joseph Channel, North Channel, and

Georgian Bay, in georgraphical sequence from W to E.

Charts 14860, *2200.–St. Joseph Island forms the W end of North Channel and separates it from the lower part of the St. Marys River. **St. Joseph Channel** leads from North Channel along the N side of St. Joseph Island and joins St. Marys River at the S end of Sugar Island.

Charts 14883, *2288.–Richards Landing, Ont., is a village on the N side of St. Joseph Island, on the SE side of the part of St. Joseph Channel known as **McGregor Bay.** The Government wharf at the village, marked by a light, has a 180-foot N face with a depth of 11 feet alongside. A marina on the wharf provides berths, gasoline, water, electricity, sewage pump-out, and a 30-ton marine railway for hull and engine repairs. Richards Landing is a **Canadian customs vessel reporting station.**

A fixed highway bridge with a clearance of 40 feet over the main navigation channel crosses St. Joseph Channel 2.6 miles NE of Richards Landing. In 1970, the controlling depth in the dredged channel under the bridge was 12 feet. The channel is marked by a **053°20′** lighted range.

Wilson Channel, 0.6 mile NE of the highway bridge, is a narrow channel between Wilson Island and the steep mainland shore. The channel is marked by buoys and the **053°17′** lighted range that marks the channel through the bridge.

Desbarats River flows into the N side of St. Joseph Channel 2.7 miles E of Wilson Channel. In 1974, the buoyed channel leading from deep water in St. Joseph Channel to the river mouth had a controlling depth of 3 feet. The river channel has a depth of about 3 feet. An overhead power cable with a clearance of 56 feet crosses the river about 0.5 mile above the mouth. Boats should not exceed a speed of 5 mph (4.3 knots) in the entrance or river channels. **Desbarats, Ont.,** a village about 0.7 mile above the river mouth, has a Government wharf with a 180-foot face. A turning basin off the wharf has a depth of 3 feet.

Campement d'Ours Island, 1.3 miles S of Desbarats River, is separated on its S side from St. Joseph Island by **Desjardins Bay.** A 120-foot public wharf on the S side of the bay has a depth of 3 feet alongside.

Chart *2288.–Hilton Beach, Ont., is a village on the N side of St. Joseph Island, 3.4 miles SE of Campement d'Ours Island. An L-shaped Government wharf at the village, marked by a light, has shelter for small craft on its SE side. The wharf has depths of about 10 feet along the outer face and 3 feet along the inner face. A marina at the wharf provides berths, gasoline, diesel fuel, electricity, sewage pump-out, a launching ramp, and minor repairs. Hilton Beach is a **Canadian customs vessel reporting station.**

Chart *2295.–Bruce Mines, Ont., is a village on the N side of North Channel opposite the E end of St. Joseph Island. A dredged channel, marked by buoys, leads NW from deep water in North Channel to a Government wharf at the village. In 1977, the channel had a controlling depth of 11 feet. The wharf had depths of 8 feet along the W side, 15 feet along the S side, and 6 feet along the E side. The wharf is marked by a light. Gasoline and diesel fuel are available by truck. Electricity is available at the wharf. Bruce Mines is a **Canadian customs vessel reporting station.**

McKay Island, marked by a light on the E end, is on the W side of the approach to Bruce Mines. Good anchorage is available on the NE side of the island in depths of 15 feet, clay bottom. Good anchorage with protection from E winds in depths of 15 feet, mud bottom, is available in **Hay Bay,** 1.2 miles NE of McKay Island.

Thessalon Point (46°14.2′N., 83°34.1′W.), 11.5 miles ESE of Bruce Mines, extends about 1 mile S from shore and is marked at the S end by a light. Good anchorage with protection from W winds is on the E side of the point in depths of 27 to 33 feet, clay bottom.

Thessalon, Ont., is a town on the inner end of the E side of Thessalon Point. **Thessalon River** flows through the town into North Channel. A reported depth of 3 feet can be carried into the river, and small craft can navigate to the first rapids, about 5 miles above the mouth. Three bridges that cross the river near the mouth have a least clearance of 5 feet. Small-craft facilities just E of the river mouth are protected on the SE side by a breakwater, marked on the W end by a light. An L-shaped Government wharf has reported depths of 3 to 14 feet alongside the S and E faces. Abrupt shoaling is reported along the S face from a point abreast the gasoline pumps; caution is advised. The approach to the wharf is marked by a **022°16′** lighted range. A marina on the N side of the Government wharf provides berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and a 6-ton marine railway for hull and engine repairs. These facilities are subject to considerable swell from E gales. Thessalon is a **Canadian customs vessel reporting station.**

Charts *2252, *2259, *2268.–Blind River, Ont., is a town on the N side of North Channel, 30 miles E of Thessalon Point, at the mouth of **Blind River.** A 300-foot Government wharf is on the W side of the river mouth. Submerged ruins extend 400 feet SSW from the wharf to a crib marked by a lighted buoy. A breakwater extends SSW from the E side of the river mouth, with submerged ruins extending 300 feet beyond. A dredged channel, marked at the outer end by buoys, leads from the crib to the wharf. In 1979, the reported controlling depth was 6 feet. The wharf is subject to considerable surge in SW winds. No services were available at the wharf in 1983. A dam 0.2 mile above the wharf blocks Blind River. Blind River is a **Canadian customs vessel reporting station.**

Serpent Harbour is an inlet on the N side of North

Channel 15 miles E of Blind River. The inlet is entered between **Hospital Point** on the N and **Emerald Point** (46°11.6'N., 82°40.5'W.) on the S. A shoal bank extends 0.25 mile S from Hospital Point. **Meteor Rock,** 18 feet high, is on the S end of the bank. **Nobles Island** is a large island in the middle of the entrance to the inlet. **Cross Island** is a small island off the W end of Nobles Island, 800 feet E of Meteor Rock. A depth of about 18 feet can be carried through the main entrance to the inlet between Meteor Rock and Cross Island. A wreck, awash, is off the N side of Nobles Island, 0.25 mile NE of Cross Island. Anchorage in depths of 13 to 16 feet, mud bottom, is E of Nobles Island.

Strong Island, 1.2 miles W of Emerald Point, is connected by a causeway to the mainland shore N. Reiss Lime Co. has an 850-foot wharf on the E side of the causeway. In 1978, the reported depth alongside was 25 feet. A chimney N of the causeway is prominent.

Charts *2252, *2257, *2268.–Aird Bay is on the N side of North Channel 9 miles E of Serpent Harbour. **Curran Rock,** awash, is marked by a daybeacon in the middle of the entrance to the bay. **Casgrain Rock,** 4 feet high, is marked by a daybeacon 0.9 mile NNE of Curran Rock. Five mooring buoys on the NW side of the bay provide a berth for tank vessels to discharge to a pipeline marked by buoys. The depth at the berth is 27 feet. The docks at the village of **Cutler, Ont.,** at the head of the bay are in ruins.

Spanish, Ont., is a town on the N side of the mouth of **Spanish River,** 5.5 miles E of Aird Bay. A dredged channel, marked by buoys, leads across the bar at the river mouth. In 1979, the reported depth in the channel was 4 feet. In 1982, shoaling was reported in midchannel in about 46°10'58"N., 82°21'28"W. The 191-foot Government wharf at the town has a depth of 4 feet alongside. A marina just E of the Government wharf provides gasoline, sewage pump-out, a launching ramp, and minor engine repairs.

Little Detroit, about 2.8 miles SSE of Spanish, is a narrow channel that joins Whalesback Channel and McBean Channel between the NE end of **Aird Island** and the mainland. A light on Aird Island marks the W entrance to the channel. A **287°30'** unlighted range marks the course through the E entrance, and a **315°** unlighted range on **Green Island,** 1 mile NW, marks the course for clearing the W end of the channel. A depth of about 16 feet can be carried through the channel on the ranges. **Ethel Rock,** 4 feet high, is on the S side of the channel. Shoals with depths of 1 to 6 feet and a spot awash extend 350 feet E of the rock.

Charts *2245, *2204, *2205.–Killarney Harbour is in the NW part of Georgian Bay opposite the E end of Manitoulin Island. The harbor is formed by **Killarney Channel,** which separates **George Island** from the mainland. The channel has midchannel depths generally of 16 feet or more and can be entered at either end of George Island. The E entrance, being deeper and less complicated, is recommended. **Killarney East Light** (45°58.1'N., 81°29.3'W.), 58 feet above the water, is shown from a white tower on **Red Rock Point,** the N side of the E entrance. A fog signal and a radiobeacon are at the light. A lighted buoy marks the S side of the E entrance. The approach to the W entrance, marked by lights and buoys, has a controlling depth of about 11 feet. Killarney Harbour has good anchorage for small craft with protection from all winds.

Killarney, Ont., a village on the N side of Killarney Channel, has a Government wharf and several private facilities. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, and a launching ramp are available. Marine railways to 50 tons are available for minor hull and engine repairs.

Charts *2244, *2204.–Key Harbour is a village at the mouth of **Key River,** 38 miles E of Killarney in the NE corner of Georgian Bay. Marinas at the river mouth provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and engine and minor hull repairs. The approaches to Key River, marked by buoys, have good water, but the marinas have depths of 0 to 2 feet alongside and are accessible only when the water level is above Low Water Datum.

Charts *2244, *2293, *2203.–Byng Inlet is in the NE part of Georgian Bay, 10 miles SSE of Key Harbour. The main entrance to the inlet, from SW, leads S of **Bigwood Island** and **Clark Island** at the mouth of the inlet. The channel is well marked by lighted ranges and lighted and unlighted buoys, and has a controlling depth of about 20 feet. Good anchorage in depths of 21 feet, mud bottom, is just SW of Bigwood Island. **Gereaux Island Light** (45°44.7'N., 80°39.6'W.), 50 feet above the water, is shown from a skeleton tower on the N end of **Gereaux Island,** on the S side of the channel. A fog signal and a radar transponder beacon (Racon) are at the light. (See Racons, chapter 1, for additional information.) A radiobeacon is about 250 feet SW of the light.

Masters of vessels entering or leaving Byng Inlet should give a **safety call** on VHF-FM channel 16 (156.80 MHz) giving the vessel's position and intentions.

Britt, Ont., is a village on the N side of Byng Inlet about 3 miles above the mouth. **Byng Inlet, Ont.,** is on the S side opposite Britt. The channel through the inlet, well marked by buoys, has a controlling depth of about 20 feet to a turning basin off the Canadian Pacific Railway wharf at Britt. In 1967, the controlling depth in the basin was 22 feet.

Wharves.–Several wharves for larger vessels are at the villages. Texaco has berthing SW of **Rabbit Island** along dolphins with depths of 20 feet alongside. Gulf Oil Jetty, on the N shore, has mooring along dolphins with depths of 23 feet alongside. The Canadian Pacific Railway wharf has depths of 18 feet alongside the E end and 5 to 10 feet along the W end.

Small-craft facilities.–The Government wharves at Britt and Byng Inlet have depths of 10 feet at the outer end and 11 feet alongside, respectively. Marinas near the villages provide transient berths, gasoline, water, ice, electricity, sewage pump-out, and hardware. A 15-ton marine railway is available for hull and engine repairs.

Charts *2284, *2225.–Sequin Bank, (45°19.3′N., 80°31.2′W.), marked at the S end by a lighted bouy, is a rocky bank with depths of 14 to 30 feet off the entrance of the channel leading into Parry Sound.

Red Rock Light (45°21.6′N., 80°24.5′W.), 66 feet avove the water, is shown from a white building with a red horizontal stripe on the N side of the entrance to the channel leading into Parry Sound; a fog signal is at the light. A radar transponder beacon (Racon) is at the light. (See Racons, chapter 1, for additional information.)

Charts *2284, *2225, *2203.–Snug Harbour is a well-sheltered inlet with good anchorage for small craft 5.2 miles E of Red Rock Light. **Snug Harbour, Ont.**, a village at the head of the inlet, has a Government wharf with a depth of 8 feet at the outer end. The channel into Snug Harbor is marked by a **070°40′** lighted range. A radiobeacon is at the rear range light. A marina at the village provides transient berths, gasoline, water, ice, and electricity.

Charts *2284, *2203, *2202.–Parry Sound is a bay on the E side of Georgian Bay, about 80 miles E of Cape Hurd. The approach to the sound is much obstructed by shoals and islands. A channel with a controlling depth of about 30 feet and well marked by ranges and lighted and unlighted buoys leads into the sound from the W. A lighted buoy about 1.2 miles SW of Red Rock Light marks the entrance to the channel. During the winter, a radar beacon (Racon) is on **Gladman Rock** in about 45°20.9′N., 80°18.9′W. (See Racons, chapter 1, for additional information.)

Charts *2284, *2203, *2202, *2226.–Parry Sound Harbour, a small bay at the SE end of Parry Sound, is entered between **Bobs Point** on the E and **Salt Point,** marked by a light, on the W. A dredged channel, marked by buoys and a **150°19′** lighted range, leads through the passage between the points. In 1978, the controlling depth in the channel was 21 feet. **Sequin River** flows into the N side of Parry Sound Harbour on the E side of Bobs Point.

Parry Sound, Ont., a town at the mouth of Sequin River, is a **Canadian customs port of entry.**

Wharves.–The 900-foot Government wharf on the W side of the river mouth has a reported depth of 21 feet alongside the outer 500 feet. Depths along the W side of the wharf are 8 to 13 feet. Water, electricity, and sewage pump-out facilities are available.

Imperial Oil Co., SE of the Government wharf, has a 500-foot wharf with a reported depth of 25 feet alongside. The 462-foot wharf of the Sifto Salt Depot, 1 mile N of Bobs Point, has a reported depth of 21 feet alongside.

Caution.–In the spring, heavy flow from Sequin River causes considerable current at the Government wharf.

Supplies.–Diesel fuel is available at the Imperial Oil Co. Wharf or by truck at the Government wharf. Provisions can be obtained in town.

Small-craft facilities.–Numerous marinas are in Parry Sound Harbour. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, and marine supplies are available. Hoists to 6 tons and marine railways to 30 tons are available for hull and engine repairs.

Charts *2284, *2203, *2202, *2227.–Depot Harbour is a recess in the S shore of Parry Sound about 3.7 miles SW of Bobs Point. The entrance to the harbor is protected by **Depot Island.** The main entrance is W of Depot Island. National Steel Co. ships iron ore from an 850-foot wharf on the N side of the E end of the harbor. The reported depth alongside is 21 feet for 300 feet on each side of the loading elevator. The 900-foot Government wharf W of the ore wharf has depths of 22 feet at the W end decreasing to 11 feet at the E end. In 1978, the wharf was in a deteriorating condition. Fish pens are along the W part of the wharf. The Government wharf at the E end of the harbor has depths of 12 to 20 feet alongside. Good anchorage is S of the National Steel Co. wharf in depths of about 25 feet, mud bottom, but vessels must avoid the submerged cable across the S part of the harbor.

Chart *2239.–Several small harbors are in the SE arm of Georgian Bay, entered about 33 miles SSE of Parry Sound. The arm is much obstructed by shoals and islands, but the channels to the harbors are well marked by lighted ranges and lighted and unlighted buoys.

Charts *2239, *2202, *2029.–Port Severn, Ont., a village on the N side of the upper end of the SE arm of Georgian Bay, is the W terminus of the Trent-Severn Waterway. (The waterway is described in chapter 5.) Marinas at the village provide transient berths, gasoline, water, ice, electricity, sewage pump-out, and marine supplies. A 26-ton hoist is available for hull and engine repairs.

Charts *2239, *2202.–Waubaushene, Ont., a village about 3 miles S of Port Severn, is at the mouth of **Matchedash Bay.** The 159-foot Government wharf at the village has depths of 7 feet alongside. Marinas at the village provide transient berths, gasoline, water, ice, electricity, marine supplies, and engine repairs.

Charts *2239, *2202, *2211.–Hog Bay is an inlet about 3.5 miles W of Waubaushene. The entrance to the bay is marked by buoys and a **148°30′** lighted range. **Victoria Harbour, Ont.,** a town on the E side of the bay on the S side of **Bergie Point,** has two Government wharfs. Depths are 13 and 5 feet along the N and S wharves, respectively. Breakwater ruins extend SW from the S side of Bergie Point to protect the wharves.

Port McNicoll, Ont., on the W side of Hog Bay, has an artificial harbor basin cut 4,500 feet into the shoreline. In July 1982, the basin had depths of 19 to 28 feet. The 3,500-foot wharf on the NW side of the basin has no facilities. Grain is shipped and received from the Marathon Realty wharf on the SE side of the basin. The wharf has a 6½-million-bushel grain elevator. Three marine legs can unload vessels at 39,000 bushels per hour and load vessels at 15,000 bushels per hour. Marinas at Port McNicoll provide berths, gasoline, water, ice, and engine repairs. A 25-ton hoist is available for repairs to wooden hulls.

Caution.–Strong S winds may reduce the water level in Hog Bay by up to 3 feet in an hour.

Midland Bay is a deep bay just W of Hog Bay. **Midland Bay Shoal,** with a least depth of 9 feet, extends from the W shore of the bay and is marked at the outer end by a lighted buoy. Good anchorage is SW of the shoal in depths of 35 to 40 feet, mud bottom.

Midland, Ont., a town on the SW side of Midland Bay, is an important manufacturing center and grain receiving port. Midland is a **Canadian customs port of entry.** A dredged basin is off the wharves at Midland. In July 1982, the controlling depth in the basin was 20 feet.

Wharves.–Midland-Simcoe receives grain at a 760-foot wharf 0.5 mile NW of the dredged basin. The wharf has a reported depth of 22 feet alongside. The wharf has a 4¼-million-bushel grain elevator and two marine legs with an unloading rate of 25,000 bushels per hour.

Three Government mooring piers extend from shore W of the dredged basin and provide 700 feet of berthing space with a reported depth of 24 feet alongside.

Midland Elevator Co. receives grain at a wharf at the S end of the dredged basin. The wharf has a reported depth of about 24 feet alongside and can handle vessels to 730 feet long. The grain elevator has a capacity of over 2½ million bushels, and a marine leg can unload vessels at 20,000 bushels per hour. It is reported that a current frequently sets off the wharf and makes docking difficult.

Several Government piers to 350 feet long are on the SE side of the dredged basin. Some of the piers are used for mooring small craft. The slip between Piers A and C has been dredged to 22 feet.

R.J. Frame and Sons Wharf is 0.3 mile NE of the dredged basin. The 980-foot wharf is in disrepair and is used as a storage area for salt and stone. The reported depth alongside is 20 feet.

Supplies.–Provisions are available at Midland. Bunkers and diesel fuel must be delivered by tank truck. Water is available at the Midland Elevator Co. and at the Government wharves.

Repairs.–Hull and engine repairs are available from the Great Lakes Boat and Machine Co. on the wharf extension SW of the Midland-Simcoe elevator.

Small-craft facilities.–Marinas at Midland provide transient berths, gasoline, diesel fuel, water, marine supplies, sewage pump-out, and a launching ramp. Hoists to 20 tons and a 20-ton marine railway are available for hull and engine repairs.

Tiffin Basin is the SE part of Midland Bay. Canadian National Railways receives grain at a 730-foot wharf on the W side of the basin. In July 1982, the basin at the face of the wharf had a depth of 21 feet with 19 feet in the turning basin N of the wharf. A **151°** lighted range marks the approach to the wharf. The wharf has a 4½-million-bushel grain elevator and three marine legs with an unloading rate of 40,000 bushels per hour. In April 1980, shoaling to an unknown extent was reported along the wharf face in about 44°44'47.5"N., 79°51'25.0"W.

Charts *2239, *2202, *2216.–Outer Harbour, the approach to Penetang Harbour, is on the W side of the SE arm of Georgian Bay. The harbor is deep and wide, narrowing at the W end. **Whiskey Island,** marked by a light and surrounded by shoals, is off the NW shore of Outer Harbour. **Black Bay,** at the inner end of Outer Harbour, has good anchorage in depths of 24 to 42 feet, mud bottom, N of the light that marks the pier ruins that extend N from Dalton (Asylum) Point.

Penetang Harbour, entered between **Michaud Point** on the W and **Dalton (Asylum) Point** on the E, is a narrow, well-protected inlet that extends 3 miles S from Outer Harbour. Depths are 20 feet in the N part decreasing to 10 feet in **South Basin** at the S end. The narrow deepwater channel between Michaud Point and Dalton Point is marked by buoys, as are the outer ends of shoals that extend from shore farther S in the harbor. Good anchorage in depths of 25 to 26 feet, mud bottom, is W of **Magazine Island** in the N part of the harbor.

Penetanguishene, Ont., is a town on the E side near the S end of Penetang Harbour. A **186°** lighted range at the S end of the harbor marks the approach to the wharves at the town.

Esplanade Wharf, 1,500 feet long, is on the E side of South Basin. The S part of the wharf is in disrepair. A Government wharf extends W from the N end of Esplanade Wharf and has 523 feet of berthing space on the N side. A T-head Government wharf just S forms a small-craft basin on its S side. Water and electricity are available.

Numerous marinas are in Penetang Harbour. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, and launching ramps are available. Hoists to 40 tons and marine railways to 60 tons are available for hull and engine repairs.

Chart *2201.–Christian Island, Beckwith Island, and **Hope Island** form an island group off the NW extremity of the peninsula that separates the SE arm of Georgian Bay from the main body. **Hope Island Light** (44°54.9'N., 80°09.9'W.), 55 feet above the water, is shown from a skeleton tower on the NE point of Hope Island, the northernmost island in the group. A fog signal and a radiobeacon are at the light. Shoals that extend 1 mile N from Hope Island are marked at the outer edge by a lighted buoy.

Nottawasaga River flows into the S end of Georgian Bay on the SE side of **Nottawasaga Bay.** Buoys mark the entrance, and a light marks the N side of the river mouth. The river is fairly deep, but local knowledge is advised.

Charts *2201, *2271.–Collingwood, Ont., is a town at the S end of Georgian Bay, on the S side of Nottawasaga Bay. Breakwaters on the NW and E enclose the town harbor.

Channels.–The approach to the harbor is marked by a **149°28'** lighted range. A radiobeacon and a ship calibrating radiobeacon are near the front range light. (See Canadian Radio Aids to Marine Navigation for details.) A dredged entrance channel, marked by buoys and a **179°59'** lighted range, leads S from deep water in the bay past the W breakwater to a turning basin just inside the outer end of the E breakwater. Dredged channels lead SE and W from the turning basin to docking facilities. The entrance channel and turning basin were dredged to 21 feet in 1974, and the channel leading SE from the basin was dredged to 17 feet in 1966. In January 1980, shoaling to 15 feet was reported in the turning basin. An 11-foot spot is in the NW part of the basin in about 44°30'44"N., 80°13'36"W. In 1968, the channel that leads W from the basin had a controlling depth of 10 feet.

Dangers.–Lockerbie Rock, with a least depth of 13 feet, is in the approach to the harbor on the entrance channel rangeline and is marked on the W side by a lighted buoy.

Anchorages.–There is no room for anchorage in the harbor. In severe weather, a considerable sea rolls in between the breakwaters, but vessels can find safe moorage at the wharves in the harbor.

Collingwood is a **Canadian customs port of entry.**

Wharves.–Grain is received and shipped from the 1,080-foot grain elevator wharf on the E side of the turning basin. The grain elevator has a capacity of 2 million bushels, and a marine leg can load or unload vessels at 22,000 bushels per hour.

A 500-foot Government wharf, 1,500 feet SE of the grain elevator, had a depth of 16 feet alongside in 1975. A 75-ton shear-leg crane is on the wharf. The Imperial Oil Co. Wharf W of the turning basin was in disrepair in 1975.

Repairs.–Collingwood Shipyards, at the head of the dredged channel, operates a graving dock with a length of 480 feet on the keel blocks and 518 feet overall, a width at the entrance of 56 feet, a depth over the sill of 14 feet. Facilities for making extensive hull and engine repairs are available.

Small-craft facilities.–A launching ramp is in the harbor. Gasoline, diesel fuel, electricity, marine supplies, ice, sewage pump-out, and hull and engine repairs are available.

Chart *2201.–Thornbury, Ont., is a town at the mouth of **Beaver River,** 12 miles NW of Collingwood. A harbor basin, protected by breakwaters, is on the NW side of the river mouth and separated from it by a narrow neck of land. A dredged channel, marked by a **212°** lighted range and buoys, leads between the breakwaters into the basin. In 1944, the entrance channel was dredged to 12 feet and the basin to 10 feet. A 600-foot Government wharf is on the SW side of the basin. Sewage pump-out facilities are available.

Charts *2201, *2271.–Meaford, Ont., is a town and small-craft harbor on the SW side of Nottawasaga Bay at the mouth of **Bighead River,** 20 miles NW of Collingwood. The harbor is formed by breakwaters that extend N from either side of the river mouth and by a N breakwater that extends W from the outer end of the E breakwater. The W end of the N breakwater is marked by a light, and the entrance channel to the harbor is marked by buoys. The harbor basin has depths of about 10 to 14 feet. A boatyard on the NW side of the basin has a 4½-ton crane. Transient berths, gasoline, diesel fuel, and sewage pump-out facilities are available.

Chart *2201.–A **danger area** of a Canadian Land Forces Exercise Area extends about 1.5 miles off the N and NE sides of the peninsula that separates the W side of Nottawasaga Bay from Owen Sound. The area, from the water surface to an altitude of 15,000 feet, is used only intermittently. The periods of use are announced by local Canadian Coast Guard Marine Radio Broadcast and may also be advertised in local newspapers. (For details, consult the Annual Edition of Canadian Notices to Mariners.)

Charts *2282, *2271.–Owen Sound Harbour, at the head of **Owen Sound,** is in the SW part of Georgian Bay, at the base of the E side of Bruce Peninsula. **Sydenham River** flows through the city of **Owen Sound, Ont.,** into the head of the sound. The grain elevator on the W side of the river mouth and the storage tanks on the E side of the mouth are prominent.

Channels.–The dredged entrance channel, marked by buoys and a **195°** lighted range, leads SSW from deep water in the sound to the mouth of Sydenham River and upstream for about 0.7 mile. A radiobeacon is at the front range light. A light marks the outer end of a pier on the W side of the river mouth. In 1964, the channels were dredged to depths of 23 feet in the entrance channel, 22 feet in the lower part of the river channel, and 18 feet in the upper part. The channel has been widened to form a basin off the grain elevator on the W side of the river mouth.

Anchorages.–Good anchorage is about 1 mile N of the front range light, W of the rangeline, in depths of 36 to 42 feet, mud bottom.

Owen Sound is a **Canadian customs port of entry.**

Wharves.–A continuous line of Government wharves extends 3,650 feet along the E side of the river. From the N end, reported depths alongside are 22 feet for 1,650 feet, thence 18 feet for the next 600 feet, thence 16 feet for 800 feet, and thence shoaling from 15 to 6 feet in the S 600 feet.

Great Lakes Elevator Co. receives and ships grain from an 840-foot wharf on the W side of the river mouth. The reported depth alongside is 21 feet. The 4-million-bushel grain elevator has a marine leg that can load or discharge vessels at an average rate of 15,000 bushels per hour.

A 780-foot wharf 1,800 feet S of the grain elevator has a reported depth of 16 feet alongside and is in disrepair. A 450-foot Government wharf, just S, has a reported depth of 14 feet alongside. A 460-foot Government wharf with a reported depth of 11 feet alongside is just S.

Supplies.–Water and electrical shore-power connections are available at all wharves. Diesel fuel is available by truck. Coal and bunker C are available with advance arrangements.

Small-craft facilities.–Transient berths, gasoline, diesel fuel, electricity, water, marine supplies, sewage pump-out, and sailboat repairs are available NW of the river mouth.

Chart *2282.–Colpoys Bay, 10 miles NW of Owen Sound, is protected from the heavy seas of Georgian Bay by three islands at its mouth: **Hay Island, Griffith Island,** and **White Cloud Island.** The bay is 3 miles wide at the mouth and narrows to about 0.8 mile at its head, 8.5 miles SW.

Wiarton, Ont., at the head of Colpoys Bay, has a 700-foot breakwater-wharf with a reported depth of 11 feet alongside. In 1979, the wharf was in fair condition. A 720-foot L-shaped Government wharf 0.4 mile SE of the breakwater-wharf has depths of 1½ to 2½ feet at the outer face and is marked on the outer end by a light. Water and electricity are available.

Colpoys Bay, Ont., is a village on the NW side of Colpoys Bay, 2.3 miles NE of Wiarton. The 300-foot town wharf, marked by a light, has reported depths of 8½ feet along the face and 3½ feet along the S side.

Excellent anchorage in depths to 60 feet is between the village of Colpoys Bay and Wiarton.

Lion's Head Harbour, about 15 miles NW of Colpoys Bay, is a well protected inlet on the S side of **Isthmus Bay.** The harbor, with general depths of 5 to 30 feet, is partially protected from N winds by a Government breakwater-wharf that extends E from the W side of the entrance. The wharf is marked by a light. The submerged ruins of a former breakwater extend 50 feet beyond the end of the wharf and are marked by a buoy. Anchorage in the harbor is not recommended because of poor holding ground. Gasoline, electricity, marine supplies, and sewage pump-out facilities are available at the wharf.

Charts *2235, *2292, *2274.–Tobermory Harbour, a deep bay at the NW extremity of Bruce Peninsula, is entered between **North Point** on the E and **Lighthouse Point** on the W, each marked by a light. **Big Tub Harbour,** the W arm of the bay, extends 0.5 mile WSW on the S side of Lighthouse Point. The shores are generally deep-to except for shoaling at the head. A sizable sea enters the arm during strong NE winds. A marina on the N side of the arm has transient berths, gasoline, diesel fuel, water, ice, and sewage pump-out facilities.

Little Tub Harbour extends about 0.2 mile S from the SE corner of Tobermory Harbour. It is reported to be a good, sheltered harbor, with mud bottom, but it is too narrow for vessels to lie at single anchor.

Tobermory, Ont., the village at the head of Little Tub Harbour, is a **Canadian customs vessel reporting station.** Berthing for small craft is available at the Government wharves at the village. Marinas at Tobermory provide transient berths, gasoline, diesel fuel, electricity, marine supplies, and sewage pump-out. Minor engine repairs are available. A ferry operates from the W side of the entrance of Little Tub Harbour to South Baymouth at the SE end of Manitoulin Island.

Chart *2292.–From **Cape Hurd** (45°13.3′N., 81°43.7′W.), the E shore of Lake Huron extends SE for about 24 miles to Lyal Island. This stretch is rocky and dangerous within 2 miles of shore; at night or in thick weather the shore should be given a wide berth.

Local magnetic disturbance.–Differences from normal variation of up to 9° have been observed about 27 miles W of Cape Hurd.

Arbutus Rock, covered 13 feet, is 1.8 miles SSW of **Cape Hurd.** Another rock, covered 13 feet, is 0.8 mile E of Arbutus Rock. **Baptist Rock,** covered 15 feet, is 0.5 mile S of **Baptist Island. Hopkins Bay** has anchorage in the NE part, but vessels must cross an 11-foot shoal that extends across the bay. **Warner Bay,** 5 miles SE of Cape Hurd, has anchorage in 16 to 22 feet, mud and sand bottom. **Eagle Harbour** is very shallow and foul, and **Dorcas Bay** is generally foul.

Campbell Reef, with a least depth of 9 feet, is 1.3 miles W of **Little Eagle Point,** the S point of Dorcas Bay. **Little Eagle Harbour** has shelter for small craft, with protection from all but SW winds close on the NW side of **Coal Oil Point. Porcupine Reef,** with a depth of 9 feet at the outer end, extends 0.7 mile SW from **Porcupine Point,** 9.5 miles SE of Cape Hurd. **Cataract Rock,** covered 15 feet, is 1 miie SW of the point. **Corisande Bay** is foul. **Huntress Reef,** with depths less than 6 feet, extends 0.5 mile SW from **Johnston Point** (45°07.0′N., 81°33.2′W.).

Johnston Harbour is a small sheltered cove, open to S and SW, with limited anchorage in the entrance between Johnston Point on the N and **Terry Point** on the S. A detached 17-foot shoal is 1.3 miles S of Terry Point.

Pine Tree Harbour, 4.2 miles SSE of Johnston Point, has anchorage for small craft in depths of about 8 feet. The entrance to the harbor is marked by buoys and a **035°26′** lighted range. **Gilphie Reef,**

with a least depth of 11 feet, is in the harbor approach on the rangeline. **Little Pine Tree Harbour** is a well-protected inlet providing limited anchorage for craft drawing less than 5 feet. From Little Pine Tree Harbour S for 3.8 miles to **Scotch Thistle Point,** detached spots with depths to 13 feet extend 1 mile from shore.

Greenough Bank, an extensive offshore bank with rocks awash, extends from a point 0.5 mile NW of Scotch Thistle Point S to a point 1.4 miles W of **Greenough Point** (44°58.3′N., 81°26.2′W.). **Cornet Ground,** with a least depth of 7 feet, is 1.6 miles SW of Greenough Point. Several other shoal spots with depths to 9 feet are in the vicinity of Cornet Ground.

Stokes Bay, 2.5 miles E of Greenough Point, is entered between Greenough Point on the N and **Lyal Island,** marked by a light, on the S. The entrance channel, well marked by buoys and a **068°55′** lighted range, leads through the shoals W of Lyal Island to the anchorage N of it. Thence buoys mark the channel to the wharf in Stokes Bay. A depth of about 14 feet can be carried to the anchorage. The anchorage, protected from the sea by the off-lying reefs, affords protection from any particular wind in depths of 10 to 34 feet, mud bottom. Vessels entering the harbor at night should not proceed beyond the anchorage. The buoyed channel from the E side of the anchorage to the wharf in Stokes Bay has a controlling depth of about 5 feet.

The 150-foot Government wharf on the NW side of Stokes Bay has a depth of about 5½ feet at the outer end. Gasoline is available. Anchorage for small craft is about 0.6 mile S of the wharf in depths of about 10 feet off the SW side of Garden Island.

From Lyal Island S for about 17 miles to **Chiefs Point** (44°41.8′N., 81°18.2′W.), shoals, rocks, and islands render the shore dangerous within 3 miles. **Wanderer Shoal,** with a least depth of 10 feet, is 0.9 mile W of Lyal Island. A 14-foot shoal is just W of Wanderer Shoal. **Lyal Reef,** with depths less than 6 feet, extends 2 miles SW from Lyal Island. **Murton Reef,** with a least depth of 6 feet, is 1.7 miles S of Lyal Island.

Little Pike Bay, 3.2 miles S of Lyal Island, has good, but limited, anchorage for small craft. A depth of about 10 feet can be carried through the narrow, crooked entrance channel, which has a sharp turn around the point on the S side of the entrance. Local knowledge is advised. A marina near the head of the bay provides engine repairs.

Lincoln Shoal has a depth of 14 feet at its N end, 1.3 miles W of the S entrance point of Little Pike Bay. The shoal extends 1.3 miles S, with a least depth of 1 foot. **Wells Shoal,** with a least depth of 12 feet, is W of the S end of Lincoln Shoal. A very shallow bank extends W from the S entrance point of Little Pike Bay to within 0.15 mile of Lincoln Shoal and thence S parallel to the shoal. A narrow channel with a depth of about 18 feet leads between the bank and shoal. **Milton Bank,** with a least depth of 2 feet, is 0.6 mile S of the S end of Lincoln Shoal. **Barrett Reef,** awash, is 0.6 mile SE of Milton Bank and is marked at the S end by a buoy.

Pike Bay, enclosed on the W by **Pike Point,** is 6.2 miles SE of Lyal Island. An approach channel, marked by a **096½°** unlighted range on **Kolfage Island,** leads S of Barrett Reef to the W side of the island. The channel around the S side of Kolfage Island is complicated and is not recommended without local knowledge. E of Kolfage Island, a **018°** unlighted range leads into Pike Bay, but because of rocks very close to the rangeline, local knowledge is advised. A marina on the E side of Pike Bay provides transient berths, gasoline, water, ice, and sewage pump-out. The owner will guide visiting craft into the bay.

Harrison Shoal, covered 6 feet, is 1.8 miles SW of Kolfage Island. **Hattie Rock,** covered less than 6 feet, is 0.6 mile S of Harrison Shoal. **Drake Shoal,** covered 8 feet, is 1.6 miles SE of Harrison Shoal. A deep narrow channel on the S side of Drake Shoal leads to an anchorage with fairly good shelter provided by the off-lying reefs. The anchorage has depths of 10 to 26 feet.

Fishing Islands and their surrounding reefs fill the waters within 3 miles of shore from Drake Shoal S for 9 miles to Chiefs Point. Several anchorages are available in this stretch: a small area N of **Beament Island** in depths of 18 feet; a limited space SE of **Burke Island** to which a depth of 10 feet can be carried between **Scout Reef** and **Scotch Bonnet Island;** and E of **Whitefish Island** in depths of 11 to 17 feet, mud bottom, with 10 feet in the approach.

Local magnetic disturbance.–Differences from normal variation of up to 17° have been observed about 14 miles WNW of Chiefs Point.

From Chiefs Point the shore curves SE and thence SW to **Frenchman Point** (44°35.5′N., 81°17.7′W.), 7 miles S. Shoals extend about 0.7 mile from shore. **Sauble River** flows into the lake 2.5 miles SE of Chiefs Point. The approach to the river is marked by buoys and an unlighted range. Since the buoys are moved frequently to mark the best water, the range is usually useful only for locating the buoyed channel. In 1977, the reported depth over the river bar was 2 feet. Marinas in the river provide transient berths, gasoline, water, and sewage pump-out.

A shoal with a depth of 8 feet at the outer end extends 0.7 mile from shore 1 mile SW of Frenchman Point. Otherwise, the shoal border is less than 0.5 mile wide for 7.3 miles SW to Saugeen River. **Lee Bank,** with rocks awash, parallels the shore from about 1 to 3.3 miles N of the mouth of Saugeen River. A buoy marks the S end of the bank. **Lambert Shoal,** with a least depth of 7 feet, is 0.7 mile NW of the river mouth, close N of the river approach channel. The S end of the shoal is marked by a lighted buoy.

Chantry Shoal is a large bank of very shallow water that extends from a point 1.4 miles WNW of Saugeen River mouth SSW for 2.5 miles. The N and S ends of the bank are marked by a lighted bell buoy and a buoy, respectively. **Chantry Island,** near the middle of the bank, is marked by a light. Submerged breakwater ruins extend from the N end of Chantry Island E to shore. A gap near the center of the breakwaters is marked by buoys. The breakwaters formerly formed a harbor of refuge E of Chantry Island, but no longer offer protection.

Southampton Harbour, serving the city of **Southampton, Ont.**, is at the mouth of **Saugeen River**, 52 miles SSE of Cape Hurd.

Channels.–An entrance channel marked by buoys and a **095°15′** lighted range leads to the river mouth. Piers at the river mouth protect a small basin. The front range light and a fog signal are on the outer end of the N pier. In 1975, the controlling depth in the entrance channel was 7 feet, but a depth of 10 feet could be carried by holding to the N side of the channel. In 1975, the midchannel controlling depth was 6½ feet to the highway bridge 0.3 mile above the mouth, thence 5½ feet to the marina just upstream.

Bridge.–A fixed highway bridge with a clearance of 29 feet crosses the river 0.3 mile above the mouth. Overhead cables above the bridge have a least clearance of 49 feet.

Caution.–The entrance channel is unsafe in heavy seas from W or NW. W winds cause a strong surge in the river mouth. Vessels should seek shelter above the bridge.

Southampton is a **Canadian customs port of entry.**

Small-craft facilities.–A marina 0.2 mile above the bridge provides transient berths, gasoline, diesel fuel, water, and electricity.

Charts *2291, *2292.–McNab Point (44°28.4′N., 81°23.6′W.), 2.2 miles SSW of Saugeen River, is marked by a light. A marker radiobeacon is at the light.

Chart *2291.–Port Elgin, Ont., is a town and small-craft harbor 4.5 miles SSW of Saugeen River. The harbor basin is enclosed by breakwaters. The entrance to the basin is marked by buoys and a **109°08′** lighted range. Private lights mark the ends of the breakwaters. In 1975, the entrance channel had a controlling depth of 5 feet, with depths in the basin of 8 to 11 feet in the S part, except for shoaling along the edges; thence in 1978, a dredged section N of the entrance had a controlling depth of 6 feet. Good anchorage is in the basin, mud bottom. A marina on the SE side of the basin provides transient berths, gasoline, diesel fuel, water, ice, electricity, and sewage pump-out. Small engine and hull repairs are available in the harbor.

Logie Rock, covered 10 feet and marked on the N side by a lighted buoy, is 2.3 miles NW of Port Elgin. From Port Elgin SW for 4.3 miles to MacGregor Point, several shallow reefs extend as much as 1.7 miles N from shore. **Belcher Reef**, the westernmost, extends to within 0.4 mile of Logie Rock with a deep channel, obstructed by 16- and 17-foot spots, between.

From **MacGregor Point** (44°25.0′N., 81°29.1′W.), the shore trends SSW for 18.5 miles to Kincardine. From MacGregor Point SW for 7 miles to **Macpherson Point**, shoals extend 1 mile from shore, thence for the rest of this stretch shoals extend no more than 0.7 mile from shore. **Loscombe Bank**, with a least depth of 9 feet, is 1 mile N of Macpherson Point. The structures at the nuclear powerplant on **Douglas Point**, 1.5 miles SW of Macpherson Point, are prominent. **Inverhuron Bay**, 3.5 miles S of Macpherson Point, has good anchorage with protection from N, E, and S winds in depths of 24 feet, sand bottom.

Kincardine, Ont., is a town at the mouth of **Penetangore River**, 26 miles SSW of Saugeen River. A water tank in the town is prominent. The approach to the river mouth is marked by a **104°30′** lighted range. A channel leads between piers at the river mouth to a basin on the S side of the river just inside the mouth. The front range light and a fog signal are on the outer end of the N pier. In 1979, the channel between the piers had a controlling depth of 8 feet, with 5 to 7 feet in the basin. The channel and basin are subject to silting from the river. A marina on the E side of the basin provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and hull and engine repairs.

From Kincardine, the shore trends SW for 9.3 miles to **Point Clark.** The shoal border and off-lying detached spots increase to a width of 1.2 miles. **Tolmie Reef**, with a least depth of 11 feet, is 1.4 miles offshore near the middle of this stretch. **Clark Reef**, covered 2 feet, is marked on the W side by a buoy 1.2 miles W of Point Clark. **Point Clark Light** (44°04.4′N., 81°45.5′W.), 93 feet above the water, is shown from a white circular tower on the point.

From Point Clark, the shore extends S for 22.5 miles to Goderich. In the N part of the reach, shoals extend 1.5 miles from shore, but then decrease to a maximum extent of 0.7 mile in the S part of the reach.

Charts *2290, *2291.–Goderich Harbour, serving the town of **Goderich, Ont.**, is at the mouth of **Maitland River**, 22.5 miles S of Point Clark. Buildings at the salt mine on the N side of the harbor and the grain elevators on the S side of the harbor are prominent.

Channels.–A channel, marked by buoys and a **086½°** lighted range, leads from deep water in Lake Huron between converging detached breakwaters to an outer harbor, thence between parallel piers to a harbor basin on the S side of the river mouth. A breakwall separates the N side of the basin from the river. The outer ends of the breakwaters are marked by lights; a fog signal is at the S light. The front range light and a radiobeacon are on the outer end of the N pier. In August 1980, the controlling depth was 20 feet through the entrance channel to the basin, with shoaling to less than 17 feet off the end of the S pier, thence 20 feet in the basin, except for shoaling to 17 feet on the N and W sides. In May 1981, shoaling to an unknown extent was reported along the edges of the entrance channel.

Anchorage.–Good anchorage is available off the piers, clay bottom. The basin does not afford anchorage because of rock bottom.

Towage.–Three small tugs are available to assist vessel movements in the basin.

Goderich is a **Canadian customs port of entry.**

Wharves.–Vessels load salt along the N pier. Grain is shipped and received on the SE side of the basin. The grain elevators of the Goderich Elevator and Transit Co. have a capacity of over 4½ million bushels. Four marine legs can unload vessels at 25,000 bushels per hour. There are two loading spouts.

Supplies.–Electrical shore-power connections are available at the wharves. Water and fuels are available by tank truck. Machine shops in the town can make minor repairs.

Small-craft facilities.–Transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, sewage pump-out facilities, and hull and engine repairs are available at the municipal marina on the W side of the basin.

Charts 14862, *2290.–From Goderich, the shore extends S for 30 miles to Grand Bend, thence 15 miles SW to Kettle Point. In the N part of this stretch, the shore is a clay bank about 75 feet high and decreasing in height to Grand Bend. The S part of the stretch is sandy beach. Shoals extend no more than 1 mile from shore. **Cantin Shoal,** boulders covered 7½ feet, is 0.9 mile offshore 3.4 miles NE of Grand Bend.

Bayfield, Ont., is a town and small-craft harbor at the mouth of **Bayfield River,** 12 miles S of Goderich. An entrance channel, dredged to a depth of 8 feet in 1978, leads from deep water in Lake Huron between piers at the river mouth to the harbor basin just inside. The approach to the river is marked by a **076°45'** lighted range, and the outer end of the S breakwater is marked by a light. A fog signal is at the light. In 1978, the W part of the basin was dredged to a depth of 8 feet and the E part to 5 feet. A 700-foot Government wharf on the S side of the basin has depths of 5 to 7 feet alongside. Marinas in the basin provide transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, and sewage pump-out. Hoists to 40 tons are available for hull and engine repairs.

Grand Bend, Ont., is a village at the mouth of the N arm of **Ausable River,** about 30 miles S of Goderich. Piers at the river mouth protect a small-craft basin just inside. A light and fog signal are on the outer end of the N pier. The entrance channel between the piers was dredged to a depth of 7 feet in 1978, but is subject to silting, and caution is advised. In September 1981, two sandbars with depths of 4½ feet or less were reported about 33 yards W of the end of the N pier. W winds cause a surge in the harbor. Transient berths, gasoline, diesel fuel, water, ice, and sewage pump-out facilities are available.

Port Franks, Ont., is a village about 0.5 mile above the mouth of the W branch of Ausable River, 8.5 miles SW of Grand Bend. Buoys mark the entrance channel. Annually the river mouth is scoured by freshets and has a reported controlling depth of 4 to 5 feet during summer, the deeper water on the S side. However, a shifting sand bank, covered about 1 foot, is lakeward of the river mouth. Local knowledge is advised. In fresh NW winds, the approach to the river is unsafe. Marinas in the river provide transient berths, gasoline, water, ice, electricity, sewage pump-out, marine supplies, a 2-ton hoist, and hull and engine repairs.

Kettle Point (43°13.0'N., 82°00.9'W.), marked by a light, is the N extremity of **Cape Ipperwash,** 25 miles NE of the head of St. Clair River. **Kettle Point Reef,** with depths of 13 feet at the outer edges, extends 2.3 miles NW and 2 miles W from Kettle Point. The NW side of the reef is marked by a lighted buoy and the W side by a buoy.

From Kettle Point SW for 11 miles to **Blue Point,** shoals extend about 2 miles from shore. About 5 miles SW of Blue Point, the shoal border decreases in width to 0.3 mile and maintains this character to within about 2.7 miles of the head of St. Clair River.

Perch Creek, 5.8 miles SW of Blue Point, is entered between breakwaters at the mouth. The breakwaters form a refuge for small craft, but it is exposed to N and W winds. In 1977, the channel between the breakwaters had a reported controlling depth of 3 feet, but is subject to silting. A highway bridge with a clearance of about 9 feet crosses the creek 0.1 mile above the mouth. Boats normally berth above the bridge, where there is little or no surge.

The shoals that fill the S end of Lake Huron at the head of St. Clair River are described at the beginning of this chapter.

11. LAKE MICHIGAN

Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake Michigan is an elevation 576.8 feet above mean water level at Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955). (See Chart Datum, chapter 1.)

Dimensions, etc.

Length, steamer track, Chicago to Straits of Mackinac; 321 miles.

Length (right line), from about longitude 87°30'W. at the S end to 85°45'W. at the N end; 307 miles.

Breadth (right line), on about latitude 45°25'N.; 118 miles.

Depth, maximum recorded by NOS; 923 feet.

Water surface of lake (including Green Bay); 22,300 square miles.

Entire drainage basin (including Green Bay); 67,900 square miles.

General description.–**Lake Michigan** is the third largest of the Great Lakes and is the only one entirely within the United States. The only natural outlet of the lake is at the N end through the Straits of Mackinac. At the S end of the lake, the Illinois Waterway provides a connection to the Mississippi River and the Gulf of Mexico. The N part of the lake has many islands and is indented by several bays; Green Bay and Grand Traverse Bay are the largest. The shores in the S part of the lake are regular, and it has been necessary to construct artificial harbors. The forested shores in the N part of the lake are sparsely populated, while those in the S part are near the heart of the great urban industrial area of the U.S. Midwest.

Fluctuations of water level.–The normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and fall, the lowest stages prevailing during the winter and the highest during the summer.

In addition to the normal seasonal fluctuations, oscillations of irregular amount and duration are also produced by storms. Winds and barometric pressure changes that accompany squalls can produce fluctuations that last from a few minutes to a few hours. At other times, strong winds of sustained speed and direction can produce fluctuations that last a few hours or a day. These winds drive forward a greater volume of surface water than can be carried off by the lower return currents, thus raising the water level on the lee shore and lowering it on the windward shore. This effect is more pronounced in bays and at the extremities of the lake, where the impelled water is concentrated in a small space by converging shores, especially if coupled with a gradually sloping inshore bottom which even further reduces the flow of the lower return currents. This condition is very pronounced at Green Bay Harbor.

Weather.–Rough water is created when strong winds blow over a long fetch of water. Northerly winds cause this on the S part of the lake and southerly winds have the same effect on the N part of the lake. They raise dangerous seas and generate hazardous currents at harbor entrances. Winds with southerly components are prevalent during the entire navigation season. Northerlies are a little less frequent, but are common, particularly in spring. The sea conditions are worst in October and November, when, lakewide, wave heights of 5 to 10 feet are encountered about 35 percent of the time. In October, S through SW winds are most often responsible, while by November W through N winds often generate rough seas. Seas of 10 feet or more are encountered 3 to 5 percent of the time from November through March. Extreme waves of 20 to 22 feet have been encountered. During the spring, high seas are infrequent, but 5- to 10-foot seas develop 15 to 30 percent of the time in the S and 20 to 40 percent in the N. Summer seas climb above 10 feet less than 1 percent of the time, while those in the 5- to 10-foot category drop to less than 20 percent in June and July. By August, the fall buildup begins.

Gales are most likely from September through April, particularly in the fall. During this season gales blow 3 to 7 percent of the time; speeds of 28 knots or more occur from 12 to 20 percent of the time. Strong winds often blow out of the W and NW, making E shore harbor entrances dangerous. The strongest measured over-the-lake wind was out of the WSW at 58 knots. However, since Green Bay recorded a 95-knot southwesterly one May, it is not unrealistic to expect a wind extreme of 100 knots or more over open waters. Spring winds can still blow strong, with winds of 28 knots or more encountered about 4 to 8 percent of the time. They do slacken from their winter fierceness, with southerlies and southwesterlies becoming more frequent and northerlies less so as summer approaches. Strong winds are infrequent in summer and mostly associated with thunderstorms. S and SW winds prevail particularly in the N; southeasterlies are also common in the S. Northerlies are a secondary wind.

Coastal winds are more localized and variable. Along the Michigan shore, spring winds are variable, particularly in the morning, when northerlies, easterlies, and southerlies are among the most common. By afternoon, aided by a lake-breeze effect, there are a preponderance of winds out of the S, particularly with the approach of summer. Summer also brings a slackening of windspeeds. The likelihood of encountering winds of 28 knots or more falls from a 4- to 10-percent chance in March to less than 3 percent by May. The most likely cause of strong winds in spring and summer are thunderstorm gusts. By summer, windspeeds of 28 knots or more occur less than 4 percent of the time and less than 2 percent most of the time. Summer winds along the shore are usually out of the E through S during the morning hours, swinging to the S and NW by afternoon, with an increase in speed. By October, there is a noticeable increase in windspeeds. Speeds of 28 knots or more increase to 4 to 6 percent. By December, these speeds can be encountered up to 11 percent of the time. Morning directions are variable, with E, S, and W winds among the most common. Afternoon winds are most often out of the S through W. The strong winds continue throughout the winter and are associated with winter storms, which bring a variety of winds from SW through NE.

Along the W shore of the lake, spring winds are variable, but the influence of the land-lake breeze is already noticeable. Morning winds often have a westerly component, while an easterly influence is evident during the afternoon. Wind strength gradually abates during spring; by May, winds of 28 knots or more are encountered less than 1 percent of the time. Except for occasional thunderstorm gusts, summer winds rarely exceed 28 knots through September. Morning breezes are generally out of the S through W. During the day, they strengthen slightly and blow out of the NE through SE; SW and W winds are also common during the afternoon, when the prevailing circulation interferes with the lake-breeze effect. With autumn comes an increase in strength and less diurnal variability. By November, winds of 28 knots or more are encountered about 1 percent of the time. Fall winds blow mainly out of the S through NW, with SW and W winds the most frequent. During winter, westerlies and northwesterlies are common, but unseemingly, winds of 28 knots or more are no more frequent than in fall.

While thunderstorms can occur at any time, they are most likely from May through September. During this period, thunder is heard on an average of 4 to 8 days per month at locations along the shore and 1 to 3 percent of the time over open water. Activity is a little more numerous in the S than the N. Over open water, July and August are the peak months, while June and July are more active along the shore. During the summer, a cool dome of air, the result of the lake breeze, often blocks thunderstorms and squall lines during the day. This results in a nighttime peak in activity. However, a severe squall line may break through this block, or due to a strong prevailing circulation, the block may not exist.

In spring, when there is often a clash between cold and warm air, thunderstorms and squall lines can be violent. On occasion they may trigger tornadoes or even waterspouts. This area lies at the NE edge of the nation's maximum frequency belt for tornadoes. Although rare, tornadoes are most likely from April through June.

Poor visibilities, caused by fog, rain, snow, and pollution, may occur in any season. Fog is the principal cause of visibilities less than 0.5 mile. It is most likely in the spring and early summer over open water (advection fog) and from late fall through spring along the shore (radiation fog).

In open waters, from March in the S and April in the N through June, warm moist air riding winds with a southerly component blowing at 5 to 20 knots reduces visibilities to less than 0.5 mile from 5 to 10 percent of the time. These fogs are most likely during the morning and early afternoon and when the air is 5° to 15°F warmer than the water. May and June are the most likely months.

The shores of Lake Michigan are subject to varying amounts of fog. Upwelling along the NW shores increases the possibility of advection fog in spring and summer; in fact, the W shore waters in general are 5 to 10°F cooler than the E shore waters. N of Chicago, visibilities drop to less than 0.5 mile on about 25 to 35 days annually. In the Chicago area, smoke and haze frequently reduce visibility to the 3- to 6-mile range, but dense fog is less common than it is to the N. It is most likely from fall through late spring with a minimum in July. Along the Michigan shore, the indication from the few locations with fog observations is that frequencies are similar to those along the Wisconsin shore. In comparing Muskegon to Milwaukee, both exhibit a morning maximum from April through October, early morning in the summer and around sunrise in other seasons. The most fog-free times occur during the afternoon in spring and late morning through evening in summer. Milwaukee is more fog prone in spring, but less in summer and fall. Overall, Muskegon averages 5 fewer days annually with visibilities less than 0.5 mile.

Ice.–The first waters to form an extensive ice cover are Green Bay and the Bays de Noc. The Straits of Mackinac and the shallow areas N of Beaver Island usually follow. The Straits are usually closed by mid-December. (See the discussion of ice in the Straits of Mackinac in chapter 10.) These buildups are aided by windrows resulting from prevailing winds and currents. In a normal winter, an early ice cover is established by the end of January and includes the above-mentioned waters plus the extreme S part of the lake. In general, ice accumulates in a southerly direction with a rapid buildup in the shallows E of Manitou and Fox Islands. In this area, the prevailing NW wind traps ice between the land masses and, with the exception of Grand and Little Traverse Bays which are solid, vessels can expect to encounter drifting ice. The surface features and location of the ice fields change as a direct function of the wind. Shores exposed to the full force of the wind often have large ice fields of very heavy brash extending 1 to 2 miles offshore. In addition, a circular current pattern in the S part of the lake distributes drifting floes along the shore. Even during a mild winter, these floes can build out 10 to 15 miles into the lake. A mild winter on Lake Michigan means about 10-percent coverage compared to an average 40-percent coverage and an 80-

percent coverage during a severe winter. Maximum ice coverage occurs by mid-March, on the average, while decay begins a week or two later. By mid-April, ships are once again transiting the Straits of Mackinac.

Routes.–The Lake Carriers' Association and the Dominion Marine Association have prescribed, for vessels enrolled in the associations, the following separation of routes for upbound and downbound traffic in Lake Michigan:

Southbound vessels, bound for Milwaukee and W shore points N thereof, shall run out 30 miles from point of departure abreast of Lansing Shoals on course to Rock Island Passage, thence to destination.

Southbound vessels, bound for W shore points S of Milwaukee, shall run out 30 miles from point of departure abreast of Lansing Shoals on course to Rock Island Passage, then head on Milwaukee breakwater to a point 19 miles 114¾° from Rawley Point Light, thence to destination; except that, vessels bound for points S of Chicago shall, from the prescribed point off Rawley Point Light, lay a course to a point in 41°55.3'N., 87°27.4'W., and thence to destination.

Southbound vessels from Sturgeon Bay and points N thereof, as far as Port Inland, bound for ports near the S end of Lake Michigan, shall lay their course to a point 19 miles 114¾° from Rawley Point Light, joining the main southbound lane, thence to destination.

Southbound vessels from the Straits of Mackinac bound for E shore points N of Point Betsie shall use the Grays Reef Passage.

Southbound vessels from the Straits of Mackinac bound for E shore points S of Point Betsie shall use the northbound course by Lansing Shoals.

Northbound vessels for Straits of Mackinac will navigate via Manitou Passage. This rule does not apply to vessels coming out of Green Bay.

Vessels downbound out of St. Martin and Rock Island Passages shall set a course to pass not more than 6 miles off Seul Choix Point.

Vessels bound from ports near the S end of Lake Michigan to Escanaba shall keep not more than 8 miles off Wind Point and not more than 5 miles off Rawley Point Light.

Northbound vessels to Port Inland from near the S end of Lake Michigan shall follow the northbound Manitou course to a point about 5.75 miles off Point Betsie, thence to about 4 miles off Boulder Reef, and thence to destination.

It is understood that masters may exercise discretion in departing from these courses when ice and weather conditions are such as to warrant it. The recommended courses are shown on charts No. 14900 and 14901, Lake Michigan.

Pilotage.–The waters of Lake Michigan are Great Lakes undesignated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great Lakes undesignated waters. Registered pilots for Lake Michigan are supplied by Upper Great Lakes Pilots, Inc. (See appendix for addresses.) Pilot exchange points are off Port Huron at the head of St. Clair River in about 43°05'30"N., 82°24'42"W. and at De Tour, Mich., at the entrance to St. Marys River. Three pilot boats are at Port Huron; HURON BELLE has an international orange hull with an aluminum cabin, and HURON MAID and HURON LADY each have an international orange hull with a white cabin. The pilot boat at De Tour, LINDA JEAN, has a green hull and a white cabin. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

Principal ports.–Most of the harbors on the E side of Lake Michigan are within the mouths of small rivers or in small lakes connected to Lake Michigan by an entrance channel. Parallel piers have been constructed at the mouths of these harbors to aid in carrying the bar into deeper water and to lessen the need for dredging in the harbor entrance. In addition, several harbors along this shore have been provided with stilling basins formed by breakwaters that converge to an entrance opening in deep water beyond the parallel piers. These basins dissipate the force of storm generated waves to prevent them from being conducted through the confined channels between the piers and into the harbors.

The harbors on the W side of the lake are generally at the mouths of small rivers, the only large streams being the Fox and Menominee Rivers which empty into Green Bay. The entrances to the harbors are generally protected by parallel piers, and some have been provided with stilling basins. Some harbor entrances are protected by detached breakwaters. Outer harbors enclosed by breakwaters have been constructed at Calumet Harbor and Milwaukee. Entirely artificial harbors, with basins enclosed by piers and breakwaters, are at Burns Waterway Harbor, Gary, Buffington, Indiana Harbor, Great Lakes, Waukegan, Port Washington, and Port Inland.

The most important harbors in Lake Michigan are Muskegon, Calumet, Chicago, Milwaukee, Kenosha, and Green Bay. Drydocking facilities for deep-draft vessels are at Chicago on the Calumet River and at Sturgeon Bay.

Charts 14880, 14881, 14902.–Old Mackinac Point (45°47.3'N., 84°43.8'W.), the northernmost point of the lower peninsula of the State of Michigan, is on the S side of the narrowest part of the Straits of Mackinac at the entrance to Lake Michigan. The point is marked by an abandoned lighthouse.

Mackinaw City, Mich., is a village and railroad terminus on Old Mackinac Point. A water tank, a radio tower, and the abandoned lighthouse on Old Mackinac Point are prominent.

Channels.–A harbor basin on the E side of Old Mackinac Point is enclosed by a railroad pier with a breakwater extending N from its outer end and by a combination breakwater and dock extending from shore on the N side of the railroad pier. The entrance to the basin, from N, is marked on either side by a light. A private fog signal is at the outer end of the railroad pier. In August 1982, the controlling depth was 10 feet in the entrance channel except for shoaling to 6 feet immediately NE of Light 2.

Dangers.–The submerged ruins of piers are 1,200 feet N and 200 feet S of the railroad pier. Each of the ruins extends 600 feet from shore.

Wharves.–A railroad-car ferry operates from the S side of the railroad pier to St. Ignace. Passenger ferries operate to Mackinac Island from the State Dock and from a private dock, 800 and 2,700 feet S of the railroad pier, respectively.

Marathon Oil Co. receives gasoline and fuel oils in a slip on the N side of the State Dock. There is 175 feet of berthing space with depths of 24 feet reported alongside and a deck height of 16 feet. The wharf has tank storage for 110,000 barrels of products.

Small-craft facilities.–Transient berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, sewage pump-out facilities, and a launching ramp are available in the harbor basin. A 12-ton hoist is available for hull and engine repairs.

Mackinac Bridge crosses the Straits of Mackinac between Mackinaw City and St. Ignace to connect the upper and lower Michigan peninsulas. The center span of the suspension bridge is 3,000 feet wide with a vertical clearance of 148 feet at the center decreasing to 135 feet at each end. The N and S suspension spans are each 1,720 feet wide with clearances of 129 feet decreasing to 86 feet at the shoreward ends. Between each of these spans and the adjacent cable anchor piers, fixed spans have clearances of 86 feet decreasing to 52 feet at the anchors. The S bridge approach has 16 fixed spans with clearances of 75 to 20 feet. The N bridge approach has 12 fixed spans with clearances of 75 to 20 feet.

The lake approaches to the center suspension span are marked by lighted and unlighted buoys. A private fog signal is under the center span on the channel line. Obstructions covered 32 and 27 feet are S of the buoyed channel on the E side of the bridge in about 45°48'05.8"N., 84°43'20.0"W., and 45°48'15.8"N., 84°43'15.5"W., respectively. The least depth N of the buoyed channel is 23 feet.

Between Old Mackinac Point and **McGulpin Point**, 2 miles W, a small bight has shallow water extending about 0.8 mile offshore. McGulpin Point is deep-to. Between McGulpin Point and Waugoshance Point, 11.5 miles W, the shore is indented by three shallow bays. The wide unnamed bay just SW of McGulpin Point has depths less than 15 feet extending 1.5 miles from its head. It affords protection in NE to SW winds. **Cecil Bay,** just W, has shallows extending 0.5 mile from shore. From the E point of the bay a very shallow bank extends 0.4 mile NW. A detached 19-foot spot is 1.1 miles N of this point. **Big Stone Bay,** just W of Cecil Bay, has deep water within 0.3 mile of its head. W from Big Stone Bay the shoal border increases to a width of about 2 miles abreast the outer end of Waugoshance Point.

Charts 14880, 14902, 14911.–Waugoshance Point (45°45.5'N., 85°00.6'W.) is a narrow strip of land jutting 2 miles W from the shoreline. Very shallow waters, rocks awash, and a group of small islands extend 3.5 miles W from the extremity of the point to just beyond **Waugoshance Island.** This area is the outcropping of an extensive bank that reaches 1.2 miles W and about 2 miles NW from Waugoshance Island. The bank, with depths of 3 to 8 feet at the outer end, is marked near the NW extent by an abandoned lighthouse. Protective riprap extends 25 feet from the base of the structure. The shoals N and W of the lighthouse, Grays Reef Passage, and the islands and shoals of the Beaver Island group will be described later.

Sturgeon Bay is a broad bay open to the W between Waugoshance Point on the N and **Sturgeon Bay Point** on the S. The N part of the bay is filled with a shallow flat over rock bottom. A shoal with depths less than 6 feet extends 0.5 mile NW from Sturgeon Bay Point.

Chart 14880.–From Sturgeon Bay Point, the shore extends S and then rounds SW for about 16 miles to **Sevenmile Point** (45°28.7'N., 85°05.5'W.). The shoal border in this stretch is generally less than 0.7 mile wide, except in the vicinity of Cross Village where the 24-foot contour is 1.2 miles offshore.

Cross Village, Mich., is about 8 miles S of Waugoshance Point and 2 miles S of Sturgeon Bay Point. In 1978, the former small-craft basin had partially filled with sand and gravel, and the breakwater was in ruins. No shelter is available at Cross Village.

Charts 14880, 14902, 14913.–Little Traverse Bay indents the E shore of Lake Michigan between Sevenmile Point and **Big Rock Point** (45°21.7'N., 85°12.1'W.). The bay is about 10 miles wide at the entrance, narrowing to 2 miles wide at its head, 11.5 miles E. The bay, with deep water and good holding ground, provides protection in all but W winds. Shoals extend about 0.5 mile off the NW shore and the head of the bay, but otherwise the shores are generally deep-to.

Harbor Point is a narrow spit that extends SE from the N shore of Little Traverse Bay to protect the harbor at Harbor Springs. **Little Traverse Light** (45°25.2'N., 84°58.6'W.), 72 feet above the water, is shown from a white skeleton tower on the end of the point.

Harbor Springs, Mich., on the N shore of Little Traverse Bay, is a fine small-craft harbor of refuge affording security in any weather. On the N shore of the harbor, docks extend to 10 to 12 feet of water, with 16 feet at the end of the city dock.

Local harbor regulations are established by the Harbor Springs City Council and are enforced by the **harbormaster.** A **slow-no wake speed** is enforced within the limits of the harbor. Copies of the regulations may be obtained from the Harbormaster, City of Harbor Springs, 349 East Main Street, Harbor Springs, Mich. 49740.

A **special anchorage** area, marked by lighted buoys, is on the N side of the harbor. (See **110.1 and 110.82a,** chapter 2, for limits and regulations.)

Small-craft facilities.–A municipal marina constructed by the Michigan State Waterways Commission and the city provides gasoline, diesel fuel, water, electricity, sewage pump-out, and harbor attendant services. Gasoline, diesel fuel, ice, marine supplies, and a launching ramp are available at marinas in the harbor. Hoists to 50 tons and a marine railway for craft to 75 feet long are available for all types of marine repairs.

The W terminus of the Inland Route, which connects Crooked Lake, Crooked River, Burt Lake, Indian River, and Mullett Lake to the Cheboygan River and Lake Huron, is about 2.5 miles E of the head of Little Traverse Bay. There is no navigable connection from Lake Michigan to the Inland Route, but an overland portage service is available for trailerable craft to 25 feet and 5,000 pounds. (For complete information see Inland Route, chapter 10.)

Petoskey, Mich., is on the S side near the head of Little Traverse Bay. A small-craft harbor at Petoskey is protected on the W by a breakwater extending N from shore and marked on the outer end by a light. The breakwater should not be passed close aboard due to large riprap stones along the sides and end. Depths in the harbor are about 24 feet at the outer end of the breakwater decreasing to 8 and 13 feet at the outer ends of the W and E municipal piers, respectively, with lesser depths at the berths.

Anchorage ground in the harbor is poor, being stony bottom.

A **speed limit** of 8 mph (7 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

Small-craft facilities.–The municipal marina constructed by the city and the Michigan State Waterways Commission on the SE side of the harbor provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and harbor attendant services. The harbormaster may be contacted on VHF-FM channels 16 (156.80 MHz), 9 (156.45 MHz), and 68 (156.425 MHz).

The Cement Division Plant of Penn-Dixie Industries is on the S shore of Little Traverse Bay about 2.5 miles W of Petoskey. Mooring cells provide 400 feet of berthing space with a deck height of 10 feet and depths of 29 feet reported alongside in 1978. A coal wharf just E of the cement facility provides 350 feet of berthing with a deck height of 10 feet and depths of 22 feet reported alongside in 1978. There is silo storage for 13,000 tons of cement and open storage for 110,000 tons of coal. The storage silos are an excellent landmark.

Big Rock Nuclear Power Plant is on Big Rock Point on the S side of the entrance to Little Traverse Bay. A large green domed building and a lighted stack provide excellent landmarks.

From Big Rock Point, the shore trends SW for about 4 miles to Charlevoix. Deep water is about 0.4 mile offshore in this stretch.

Charts 14913, 14942.–Charlevoix, Mich., is a city and harbor at the mouth of **Pine River,** about midway of the rounding shore between Little Traverse Bay and Grand Traverse Bay. A floodlighted water tank on the S side of the harbor entrance is prominent.

Channels.–A dredged entrance channel leads SE from Lake Michigan between parallel piers through the lower portion of Pine River to Round Lake, the harbor proper of Charlevoix. The outer ends of the piers are marked by lights. From the E end of Round Lake, a dredged channel leads SE through the upper portion of Pine River to Lake Charlevoix, entered about 1 mile distant from the Lake Michigan shoreline. Mooring to the Government piers or revetments is prohibited.

In 1983, the controlling depths were 18 feet from deep water in the lake through the approach channel, thence 16 feet (17 feet at midchannel) between piers to Round Lake, thence 17 feet (18 feet at midchannel) from Round Lake to Lake Charlevoix.

Round Lake, about 0.4 mile in diameter, has depths to 60 feet, with deep water generally close to shore. The lake has good anchorage.

Anchorages.–A special anchorage, marked by buoys in the N part of Round Lake, has good holding ground, sand and gravel bottom. (See **33 CFR 110.1 and 110.82,** chapter 2, for limits and regulations.)

Bridges.–Bridge Street (U.S. Route 31) bridge crosses Pine River just below Round Lake. The bridge has a bascule span with a clearance of 16 feet. The Michigan Northern Railway bridge across the head of Pine River has a swing span with a clearance of 10 feet. The navigable channel is through the S draw. In March 1984, the railroad bridge was being removed. (See **33 CFR 117.1 through 117.59 and 117.641,** chapter 2, for drawbridge regulations.)

Currents.–Currents in Pine River are reported to reverse twice daily with a velocity up to 3 mph. At times they may reach a velocity up to 5 mph.

Charlevoix Coast Guard Station is on the N side of the Pine River entrance to Lake Charlevoix just W of the railroad bridge.

Harbor regulations.–Federal regulations specify a **speed limit** of 8 mph (7 knots) in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) Local harbor regulations have been established by the city of Charlevoix and are enforced by the **harbormaster.** A **slow-no wake speed** is enforced. Copies of regulations may be obtained from the Chief of Police, City Hall, 210 State Street, Charlevoix, Mich. 49720.

Small-craft facilities.–The municipal marina on the W side of Round Lake provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and harbor attendant services. Other marinas in the lake provide gasoline and diesel fuel. Hoists to 20 tons are available for hull and engine repairs.

Ferry.–Ferry service is available between Charlevoix and St. James Harbor on Beaver Island from April to December. Reservations are required for autos, but not for passengers or freight. The ferry terminal is on the W shore of Round Lake about 300 feet SE of the U.S. Highway 31 bridge.

Lake Charlevoix extends about 14 miles SE from the head of Pine River and is from 1 to 2 miles wide, with depths to over 100 feet and deep water generally close to shore. **Boyne City, Mich.,** is at the SE end of the lake. A public docking facility provides transient berths, water, electricity, and sewage pump-out. At **Advance, Mich.,** about 2.5 miles W of Boyne City, the Northern Michigan Electric Cooperative, Inc. has a coal dock providing about 500 feet of berthing space between dolphins. The dock has a deck height of 8 feet with a depth of 20 feet reported alongside in 1978. About 5 miles from the NW end of Lake Charlevoix, **South Arm** extends 9 miles S from **Ironton** at the N end to **East Jordan** at the S end. A public docking facility at East Jordan provides transient berths, water, and electricity.

A **slow-no wake speed** is enforced in the narrows of South Arm opposite Ironton. (See Small-craft Regulations, State of Michigan, chapter 3.)

Cable Ferry.–A cable ferry crosses South Arm at Ironton. The self-propelled ferry is guided across the 600-foot-wide channel by two cables which are anchored ashore and pass along each side of the ferry at deck level. The cables are at a depth of about 20 feet at midchannel when the ferry is docked on either shore. When the ferry is at midchannel, the cables are at their least depths. The ferry should not be passed within about 200 feet when docked at either shore. **DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.**

From Charlevoix W for 1.8 miles to **South Point** (45°19.3'N., 85°18.0'W.), shoals extend about 0.25 mile offshore. A lighted bell buoy marks the N extent of the shoals off South Point.

The Medusa Cement Co. has a facility for shipping cement and receiving coal on the E side of South Point about 1.5 miles W of Charlevoix. Lighted loading silos and the tallest stack (45°19'01.5"N., 85°18'00.8"W.) at the facility are prominent. A breakwater formed by two sunken barges extends about 1,600 feet lakeward from the shore and affords protection for the privately dredged channel along its S side and for the loading slip at its inner end. A private light marks the outer end of the breakwater. The entrance channel and slip are reported to be dredged to 24 feet annually. The slip is about 100 feet wide. The N side, 645 feet long, is used to ship cement. The S side, 556 feet long, is used to receive coal for plant consumption. The docks have a deck height of 10 feet, and there is silo storage for 120,000 tons of cement. Six spouts can load vessels at 3,000 tons per hour.

Chart 14913.–Fisherman Island, about 4 miles SW of South Point, is on the NE side of the entrance to Grand Traverse Bay. The island is on a stony bank that extends about 1 mile NW from shore with depths of 6 to 9 feet at the outer edge. A buoy marks the extent of the bank.

Grand Traverse Bay, separated from Lake Michigan by the **Leelanau Peninsula,** extends S from the lake for about 32 miles and is about 10 miles wide. The upper 17 miles of the bay are divided into **East Arm** and **West Arm** by a narrow peninsula that extends N and terminates in Old Mission Point. The shores of Grand Traverse Bay are generally hilly and wooded.

The E shore of Grand Traverse Bay, from Fisherman Island to the S end of East Arm, is bordered by shoals, rocky spots, and ledges, and should not be approached closer than 1 mile. A shoal with a least depth of 15 feet is 2.8 miles off the E shore of the bay 11.5 miles S of Fisherman Island. A lighted bell buoy marks the W side of the shoal.

Elk Rapids, Mich., is a village and small-craft harbor on the E shore of the bay about 12 miles from the head of East Arm at the mouth of **Elk River.** The harbor is entered through an entrance channel that leads S from the bay between two breakwaters to a basin at the river mouth. The outer ends of the breakwaters are marked by private lights, and the channel is marked by private buoys and a private leading light on the point inside the breakwaters. The entrance channel has been privately dredged to a depth of about 5½ feet. A public dock in the harbor provides transient berths, gasoline, water, electricity, sewage pump-out, and a launching ramp.

At **Deepwater Point,** on the E shore about 3 miles from the head of the East Arm, there are piles formerly used for mooring self-unloading coal vessels. **Cuttysark Harbor,** 1.2 miles S of Deepwater Point, has a marina which provides transient berths, gasoline, diesel fuel, water, electricity, and sewage pump-out. The outer ends of the breakwaters are marked by private lights. A shallow flat, with depths less than 18 feet, extends 1.3 miles from the head of East Arm.

Elk Lake, Lake Skegemog, Torch Lake, Clam Lake, Bellaire Lake, and their connecting waters are adjacent to and generally parallel the E shore of East Arm. These waterways are used by small craft, but there is no navigable outlet from any of these lakes to Grand Traverse Bay.

Lake Skegemog, opening from the SE side of Elk Lake, is about 3.5 miles long and 1.3 miles wide. From it the Torch River extends about 2 miles N to Torch Lake, about 18 miles long N and S with a width of from 1 to 2 miles. From the E side of Torch Lake at Clam River, about 6 miles from its S end, a passage leads E through Clam Lake, and thence N into Bellaire Lake. From the E side of Bellaire Lake, a channel extends N about 2.5 miles to Intermediate Lake, but at the town of Bellaire, about 1.5 miles from Bellaire Lake, a dam across the stream bars passage through to Intermediate Lake.

A **slow-no wake speed** is enforced on Torch River and the adjacent waters of Torch Lake for 300 feet, on Clam River from Torch Lake to Clam Lake, on Grass River from Clam Lake to Lake Bellaire, and on Intermediate River from Lake Bellaire to Intermediate Lake.

The W shore of East Arm may be approached within 0.3 mile except in the upper 2.5 miles where shoals extend 0.5 mile offshore. **Old Mission Harbor,** 2.5 miles S of Old Mission Point, affords good shelter in winds from SW through N to E. Deep water is within 0.1 mile of the head of the bay and the NE shore. Shoals extend 0.25 mile off the SW shore, and a shoal extends about 0.3 mile SE from the E point of the bay. In 1983, a submerged obstruction was reported to be SE of Old Mission Harbor in about 44°57'30.7"N., 85°28'24.5"W. to Old Mission Point, shoals extend 0.3 mile off. At **Old Mission Point** (44°59.5'N., 84°28.8'W.), marked by an abandoned lighthouse, a shoal bank, with depths less than 12 feet near the outer edge, extends 1.5 miles N and W. The bank should not be navigated, even by small craft.

Mission Point Light, on a detached shoal 2 miles NW of Old Mission Point, is a guide into the East and West Arms of Grand Traverse Bay. A small rocky ledge, covered 22 feet, is 1.7 miles NE of the light.

From Old Mission Point, the E shore of West Arm extends 2 miles SW to **Merril Point,** thence 6 miles S to **Tucker Point** (44°53.4'N., 85°33.5'W.). Along this stretch, the shoal border gradually widens from 0.2 mile to 0.75 mile, just N of Tucker Point. A shoal, with several bare spots, extends 0.4 mile S from Tucker Point; the S extent of the shoal is marked by a buoy.

Bowers Harbor, enclosed on the W by Tucker Point, provides secure anchorage with shelter from all but SW winds. A marina on the NE side provides transient berths, gasoline, water, electricity, a launching ramp, and limited hull and engine repairs to trailerable craft. **Marion Island** is off the mouth of Bowers Harbor, 1.3 miles SW of Tucker Point. Shoals extend 0.4 mile N and 0.9 mile SW from the island. Buoys mark the NE and SW extent of the shoals. A wreck, covered 32 feet, is just N of the buoy marking the SW shoal.

The E shore of West Arm, from Bowers Harbor to the head at Traverse City, is clear to within 0.25 mile.

Traverse City, Mich., at the head of West Arm, is the principal harbor on Grand Traverse Bay. Prominent are the stack and chimneys of the city powerplant and the Park Place cupola, about 2,400 feet SE of the powerplant. The principal cargoes handled in the port are petroleum products and coal. Good anchorage is available off the city.

The **Great Lakes Maritime Academy** of Northwestern Michigan College is in Traverse City, Mich. Maritime oriented courses, including seamanship, navigation, communication, and maritime law, prepare cadets for positions aboard Great Lakes ships. Further information may be obtained from The Dean of Admissions, Northwestern Michigan College, 1701 East Front Street, Traverse City, Mich. 49684.

Channels.–A dredged basin is on the W side of West Arm about 1.5 miles N of the city. The basin is formed by a breakwater extending S from shore on the E side and a detached breakwater on the S side. The outer ends of the breakwaters are marked by lights. In August 1982, the controlling depths were 12 feet in the S part of the basin and 10 feet in the N part except for shoaling to 5 feet along the E edge and 8 feet in the NE corner.

Boardman River flows from **Boardman Lake** through Traverse City and empties into the head of West Arm. The mouth of the river is protected by parallel piers; the outer end of the W pier is marked by a private light. The river has depths of about 2 feet for 0.3 mile, thence 1 foot to a dam 1.2 miles above the mouth. Currents in the river are swift. Below the dam, the river is crossed by six fixed highway bridges with a minimum clear width of 10 feet and a minimum clearance of 5 feet.

Traverse City Coast Guard Air Station, is about 2 miles SE of the mouth of Boardman River. The air station supports Coast Guard surface operations, carries out search and rescue missions, and renders airborne assistance. The air station can be contacted on VHF-FM channel 16 (156.80 MHz) or through the nearest Coast Guard station.

Harbor regulations.–Local harbor regulations are established and enforced by the **harbormaster** who can be reached at the Traverse City Police Department, 520 W. Front Street, Traverse City, Mich. 49684. Copies of the regulations can be obtained from the harbormaster.

Wharves.–Traverse City has three active deep-draft facilities. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

Traverse City Coal Dock: (44°47'11"N., 85°38'08"W.); 210-foot face; 18 feet alongside N end; deck height, 6 feet; vessels dock port side to; open storage for 16,000 tons of coal; receipt of coal and slag; owned and operated by city of Traverse City.

Naph-Sol Refining Co. Dock: 0.2 mile S of Coal Dock; 300 feet of berthing space along dolphins; 32 feet alongside; tank storage for 7¼ million gallons; receipt of light oils; owned and operated by Naph-Sol Refining Co.

Total Petroleum, Inc. Dock: 0.25 mile S of Coal Dock; 375 feet of berthing space along dolphins; 23 feet alongside; deck height, 10 feet; tank storage for about 10½ million gallons; receipt of petroleum products; owned and operated by Total Petroleum, Inc.

Small-craft facilities.–A dredged small-craft basin protected by breakwaters is at **Greilickville,** about 1.5 miles N of Traverse City. The outer ends of the breakwaters are marked by lights. A facility constructed by the city and the Michigan State Waterways Commission on the W side of the basin provides berths, electricity, gasoline, water, sewage pump-out, and a launching ramp. A marina at the N end of the basin provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, marine supplies, and a launching ramp. A 30-ton mobile hoist is available for hull and engine repairs. In 1978, depths of 7 to 15 feet were reported alongside the docks, with 10 feet at the fuel pumps.

A public small-craft basin constructed by the city and the Michigan State Waterways Commission is protected by breakwaters at the head of West Arm, 0.5 mile W of the mouth of Boardman River. The entrance to the basin is marked on the N side by a private light. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out facilities, a launching ramp, and harbormaster services are available.

N from Traverse City for 11 miles to **Lee Point** (44°55.5'N., 85°36.2'W.), shoals extend about 0.3 mile offshore, except at a point 2 miles N of Traverse City where a shoal with a least depth of 6 feet extends 0.5 mile offshore. The outer edge of the shoal is marked by a lighted buoy. The buoy is sometimes difficult to distinguish at night because of vehicle taillights on the shore highway. A shoal with depths of 7 to 18 feet extends 2.5 miles S from Lee Point. The S end is marked by a buoy. From Lee Point N for 5.5 miles to **Stony Point (Suttons Point),** shoals extend no more than 0.6 mile offshore. A lighted bell buoy 0.7 mile NE of Lee Point marks the outer edge of the shoal bank. A buoy marks the outer edge of the shoal that extends 0.3 mile N from Stony Point.

The shore from Stony Point N to **Omena Point** has generally deep water within 0.4 mile. **Omena Bay,** behind Omena Point, has good water with secure anchorage and shelter from all winds from SW through N to E. Gasoline is available at a small marina at **Omena, Mich.,** at the head of Omena Bay. In 1978, a depth of 5 feet was reported alongside.

Suttons Bay extends 2.5 miles SW from Grand Traverse Bay on the W side of Stony Point. The bay affords good anchorage with protection from all but NE winds. Shoals extend 0.2 mile from the E shore and head, and 0.4 mile from the W shore. **Suttons Bay, Mich.,** is a village on the W side of the head of the bay. A public small-craft facility constructed by the Michigan State Waterways Commission at the village provides transient berths, gasoline, water, electricity, sewage pump-out, and a launching ramp. Limited repairs are available.

Northport Bay is an indentation on the W side of Grand Traverse Bay between Omena Point and **Northport Point,** Shelter is available in the bay from all but SE winds, but the holding ground is poor, being either mud or rock. A shoal marked at the outer edge by a lighted bell buoy extends 0.5 mile SE from Northport Point. Shoals extend no more than 0.5 mile offshore in the bay, but there are several dangerous detached shoals in the bay. About 0.5 mile W of Northport Point, a shoal with rocks awash is about 1.2 miles long N and S. A buoy marks the S end of the shoal. A 3-foot shoal, marked on the S side by a buoy, is 1 mile W of Northport Point. **Bellow Island** is in the entrance to the bay, 2.4 miles S of Northport Point. Shoals extend about 0.3 mile off around the island. Two 14-foot spots are 1 mile N and a 17-foot spot is 0.6 mile NW of Bellow Island.

Northport, Mich., is a village and small-craft harbor on the W side of Northport Bay. A breakwater marked at the outer end by a private light protects a small-craft basin constructed by the village and the Michigan State Waterways Commission. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out facilities, and a launching ramp are available. A marine railway for craft to 65 feet and 30 tons, and a mobile hoist for sailing craft to 42 feet, are available for hull and engine repairs about 1 mile N of the village.

From Northport Point N to Lighthouse Point, deep water is generally within 0.5 mile of shore. An 18-foot spot is 1 mile offshore 4.3 miles NE of Northport Point. **Lighthouse Point** is the N end of the Leelanau Peninsula, which separates Grand Traverse Bay from Lake Michigan. Shoals extend 0.7 mile N from the point. **Grand Traverse Light** (45°12.6'N., 85°33.0'W.), 50 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on Lighthouse Point.

Charts 14902, 14911.–An extensive area of off-lying islands and shoals is in Lake Michigan from the vicinity of Waugoshance Point SW to Lighthouse Point.

A group of shoals about 4 miles long E and W has its N limit about 3.5 miles N of Waugoshance Island along the S side of the vessel route between the Straits of Mackinac and Grays Reef Passage. **Rose Shoal,** the southernmost of the group, has a least depth of 11 feet 2.6 miles NNW of Waugoshance Island. Bordering the S side of the vessel route, **New Shoal No. 1,** the easternmost of the group, has a depth of 14 feet over boulders. **New Shoal No. 3,** the westernmost of the group, has a least depth of 16 feet. A lighted bell buoy at the NW end of the shoal marks the E side of the route through Grays Reef Passage. **New Shoal No. 2,** midway between the other two, has a least depth of 17 feet and is marked on the N side by a lighted buoy. A group of wrecks, covered 20 feet, is 0.7 mile N of New Shoal No. 2.

White Shoal, 6.2 miles NW of Waugoshance Island, is about 2 miles long E and W. The W end of the shoal is awash. **White Shoal Light** (45°50.5'N., 85°08.1'W.), 125 feet above the water, is shown from a red and white spirally banded conical tower on the E end of the shoal. A fog signal and a radar transponder beacon (Racon) are at the light. (See Racons, chapter 1, for additional information.) Riprap extends 25 feet from the base of the light and it should not be passed close aboard even by shallow-draft vessels. A buoy marks the W end of White Shoal. An 18-foot shoal is 0.8 mile NW of the buoy, and several shoal spots with depths of 20 to 30 feet are close around White Shoal.

Simmons Reef, about 5 miles NW of White Shoal, is about 2.8 miles long E and W and 1.6 miles wide. The reef has a rock awash near its center and depths of 3 to 6 feet scattered over a large area. The reef is dangerous in that it is composed of boulders that make up quickly from deep water. A lighted bell buoy marks the S side of the reef.

Fagan Reef, 3 miles NW of Simmons Reef, is about 4 miles long and 2 miles wide. It has numerous shoal spots with depths less than 24 feet and a least depth of 10 feet at its W end.

St. Helena Island and Shoal, Manitou Paymen Shoal, and other shoals along the N shore are discussed with the N shore of Lake Michigan.

Vienna Shoal, with a least depth of 12 feet, is 2.4 miles WNW of Waugoshance Island on the E side of Grays Reef Passage. **East Shoal,** 1.4 miles SSW of Vienna Shoal, has a least depth of 17 feet. A lighted buoy on the W end of the shoal marks the E side of the dredged channel through Grays Reef Passage.

Grays Reef is an extensive area of shallow water over rocks that extends from Grays Reef Passage W for 8.5 miles to Hog Island. The reef has depths ranging from rocks awash to 18 feet.

Grays Reef Passage, between Vienna Shoal and East Shoal on the E and Grays Reef on the W, is the main route for vessels drawing less than 25 feet between the Straits of Mackinac and harbors S in Lake Michigan. The passage is obstructed at the center by **Middle Shoal,** with a depth of 17 feet, and by a bank with depths of 21 to 25 feet and a dumping ground close N of Middle Shoal. The main vessel route through the passage is a dredged channel, marked by a light and lighted and unlighted buoys, on the E side of Middle Shoal. **Grays Reef Light** (45°46.0'N., 85°09.2'W.), 82 feet above the water, is shown from a white square tower on the W side of the dredged channel, just SE of Middle Shoal. A fog signal, radiobeacon, and a radar beacon (Racon) are at the light. (See Racons, chapter 1, for additional information.) The light should not be passed close aboard due to protective riprap. From the N end, the course through the channel is **186°** to Grays Reef Light and thence **216½°** toward North Manitou Shoal Light. In 1983, the controlling depth was 25 feet in the dredged channel. The channel through Grays Reef Passage on the W side of Middle Shoal is unmarked and no longer used by large vessels.

Grays Reef Passage is a **regulated navigation area.** (See **33 CFR 165.1 through 165.13, and 165.901 (b) and (c),** chapter 2, for limits and regulations.)

Ile aux Galets (locally pronounced skill-a-gal-lee) is a small island 7.7 miles SW of Waugoshance Island on the E side of the approach to Grays Reef Passage from the S. Shoals that extend 1.8 miles E from the island are marked at the outer end by a gong buoy, and shoals that extend 0.5 mile NW from the island are marked by a bell buoy. **Ile aux Galets Light** (45°40.6'N., 85°10.3'W.), 58 feet above the water, is shown from a white octagonal tower on the island.

Dahlia Shoal, 3.7 miles SSW of Ile aux Galets, has a least depth of 14 feet and is marked on the W side by a buoy. A 21-foot spot is 1 mile NE of the buoy.

Hat Island, the easternmost of the island group lying W of Grays Reef Passage, is on the N edge of Grays Reef, 11.5 miles WNW of Waugoshance Island and 10.5 miles NE of Beaver Island. Shoals extend 0.5 mile N from the island.

Hog Island, 5.5 miles NE of Beaver Island, is low and wooded and completely surrounded by very shallow flats. Grays Reef extends E from the island, and shoals extend about 1.5 miles N and 2.5 miles S from the island. A very shallow bank, with numerous rocks awash, connects the island to Garden Island, 3 miles W. There is no vessel passage across the bank, which extends about 2 miles S from a line connecting the S ends of the islands. **Hog Island Reef,** a detached shoal 3.2 miles SSE of the island, has a least depth of 5 feet and is marked on the E side by a buoy.

Garden Island, 1.5 miles N of Beaver Island, is generally high and wooded and is surrounded by shoal water. **Garden Island Shoal,** 2.5 miles N of Garden Island, has a least depth of 15 feet and is marked at the NE end by a lighted bell buoy. A shoal with a least depth of 16 feet is 1.2 miles N of Garden Island.

Squaw Island, 3 miles WNW of Garden Island, is the northwesternmost of the island group W of Grays Reef Passage. An abandoned lighthouse is on the N end of the island. A shoal bank extends about 0.7 mile from the E, S, and W shores of the island; a buoy marks the outer edge of the bank on the E side. A shoal with depths of 6 to 16 feet that extends about 2 miles NNE from the island is marked at the outer end by a buoy. A detached 14-foot shoal is 1.8 miles NE of the island, and rocky spots covered 12 to 17 feet are 1 mile NW of the island.

Whiskey Island is about 3.5 miles W of Garden Island and 1.7 miles SW of Squaw Island. Shoals extend about 0.5 mile offshore around the island, except about 1 mile E and SE. A buoy is 1 mile ESE of the island. A large detached bank, with several spots awash, is 1.2 miles SW of the island. The S side of the bank is marked by a buoy.

In the passage between Garden Island on the E and Squaw and Whiskey Islands on the W, numerous detached ledges and spots have depths of 1 to 14 feet. Passage without local knowledge, by even shallow-draft vessels, is not recommended.

Lansing Shoals, an extensive area of boulders with depths less than 24 feet, is from 4.4 to 6.2 miles N of Squaw Island. The shoalest spot, covered 13 feet, is at the SE end of the ledge. **Lansing Shoals Light** (45°54.2'N., 85°33.7'W.), 69 feet above the water, is shown from a square gray tower on the S side of the 13-foot spot; a fog signal is at the light. Riprap extends 50 feet from the base of the light, and it should not be passed close aboard even by shallow-draft vessels. The light marks the N side of the vessel route from the Straits of Mackinac for vessels drawing over 25 feet.

Beaver Island, the principal island in the group W of Grays Reef Passage, is 13 miles long N and S with a maximum width of 6.5 miles. The wooded island is bluff on the W side and lower on the E side. Shoals extend about 0.5 to 1 mile offshore around the island, except in Sandy Bay, about midlength of the E side, where deep water is within 0.2 mile of shore.

The shoal bank that extends 0.7 mile NE from Beaver Island is marked at the outer edge by a lighted buoy. A 3-foot depth is just inside the buoy.

Several reefs with depths of 8 to 12 feet are 1.5 miles E and 0.8 mile NE from the NE end of Beaver Island. These limit the draft for vessels navigating the channel between the shoal banks that extend off the N side of Beaver Island and the S side of Garden Island.

St. James Harbor is a bight near the NE end of

Beaver Island and is the harbor for the village of **St. James, Mich.**, on the NW side of the harbor. The harbor is protected on the E by **Sucker Point** and provides protection from all but SE winds. Sucker Point is marked on the SW side by **St. James Light** (45°44.6'N., 85°30.5'W.), 38 feet above the water and shown from a white cylindrical tower. Deep water extends from the lake across the center of the harbor, with the S end of the harbor shoal. Another shoal extends W across the harbor from Sucker Point to St. James, with deep water on the N side of the shoal near the head of the harbor. In August 1982, the dredged channel across the shoal had a controlling depth of 10 feet.

Vessels approaching St. James Harbor must take care to avoid the shoal bank that extends S and E from Sucker Point. A lighted buoy and a buoy mark the S and SE limits of the bank, respectively. On the S side of the harbor entrance, shoals extend about 0.4 mile NE and 1 mile SE from **Looney Point.** The limits of these shoals are marked by a buoy and a lighted bell buoy, respectively. A detached gravel and boulder bank, covered 14 feet, is about 2 miles E of Looney Point.

Small-craft facilities.–A public dock constructed by the village and the Michigan State Waterways Commission at St. James provides transient berths, gasoline, water, ice, electricity, sewage pump-out, a launching ramp, and harbormaster services. Hoists to 30 tons and diesel fuel are also available in St. James.

Ferry.–Ferry service is available between St. James Harbor and Charlevoix, Mich., from April to December. Reservations are required for autos, but not for passengers or freight. The ferry terminal is 0.5 mile NW of St. James Light.

High Island, about 3.8 miles W of the N end of Beaver Island, is a wooded island with a high sand ridge along the length of the W side. Shoals extend to 1 mile off the W shore and 0.5 to 0.8 mile off the S and E shores, except at the NE end of the island where a narrow point extends 0.5 mile E. Under this point, deep water is close-to, and good anchorage is available with protection from all but E and SE winds. Shoals extend 1.2 miles N and NE from this point. A shoal bank with depths of 12 to 15 feet extends about 2 miles NW from High Island and connects with the shoals surrounding Trout Island.

Trout Island, 1.6 miles N of High Island, is connected to it by a shoal bank. Passage between the islands is unsafe for vessels drawing over 6 feet. A 4-foot spot 0.6 mile S of Trout Island must be avoided. Shoals extend about 0.2 to 0.5 mile offshore around Trout Island. **Trout Island Shoal,** 1.9 miles W of Trout Island, has a least depth of 11 feet and is marked on the NW side by a buoy.

Gull Island, 6.7 miles W of High Island, is low, flat, and somewhat wooded. Shoals extend generally 0.5 mile offshore, except for banks that reach 1 mile SSE and 1.7 miles NE. Detached 21- and 23-foot spots are 1 mile NNW and 1.6 miles SE of the island, respectively. **Gull Island Light** (45°42.7'N., 85°50.6'W.), 77 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on a bare spot close NW of the island. **Gull Island Reef,** about 4 miles SE of the island, has a least depth of 3 feet and depths of 9 to 15 feet over a large area.

Richards Reef, about 8 miles W of Beaver Island Light, is covered 22 feet.

Boulder Reef, 9.5 miles SW of Gull Island, has a least depth of 15 feet and is marked on the S side by a lighted bell buoy.

Charts 14902, 14912.–North Fox Island, 10 miles SW of Beaver Island, is wooded. Shoals extend no more than 0.3 mile offshore except on the S and W sides where depths of 5 to 13 feet reach 1 mile from shore.

South Fox Island, 4 miles SW of North Fox Island, is hilly on the W side and lower and wooded on the E side. An abandoned lighthouse is on the S end of the island. The E and W sides of the island are fairly deep-to, except for a 13-foot spot that reaches 0.8 mile off the W shore. A shoal bank and detached 18- to 21-foot spots reach 2.4 miles N from the island. A detached 21-foot spot is 3.3 miles N of the island. Shoals extend 0.8 mile around the S point of the island.

Caution.–Currents with velocities up to 2 mph are of frequent occurrence around North and South Fox Islands. Mariners should exercise caution while navigating in the area.

South Fox Island Shoals is an extensive bank reaching 9 miles S from South Fox Island. A lighted buoy marks the S end of the bank. The bank has general depths of 15 to 30 feet with some shoaler spots. Two 9-foot spots are 4.2 and 7 miles S of South Fox Island, and an 11-foot spot is 6.4 miles S of the island. Buoys 4.2 and 6.2 miles S of the island mark a deepwater passage through the shoals. The bottom in the vicinity of the shoals is rocky, and deep-draft vessels should exercise caution in thick weather.

Charts 14902, 14913, 14912.–Lighthouse Point (45°12.6'N., 85°32.7'W.), the N point of the Leelanau Peninsula, is marked by Grand Traverse Light. Between Lighthouse Point and **Cathead Point,** 3.6 miles SW, **Cathead Bay** affords shelter in S winds. The bay is shoal however, with two rocky ledges that extend 0.9 mile from shore. Approaching Cathead Point from W, a clump of trees on the point gives it the appearance of an island.

From Cathead Point SW for 14.5 miles to **Carp River Point,** the shore is generally bluff and hilly. Shoals extend generally less than 0.8 mile from shore, except for detached 7- and 8-foot spots 1.2 miles offshore 5 miles NE of Carp River Point. Leland, Mich., is 1.2 miles NE of Carp River Point.

Charts 14902, 14912.–Leland, Mich., is a village and small-craft harbor at the mouth of Leland River about 32 miles SW of Charlevoix. Local fish tugs, a log barge, and recreational craft are the principal users of the harbor.

Channels.–The harbor is protected on the N and NW by a detached breakwater and on the SW by a pier extending lakeward from the S side of the mouth of Leland River. The outer end of the pier and the SW end of the breakwater are marked by lights. An anchorage area inside the breakwater is approached from the SW through a dredged channel between the breakwater and pier. A dredged channel leads from the S end of the anchorage to the mouth of the river, and a marina basin, maintained by private interests, is on the E side of the anchorage.

In July 1985, the controlling depths were 12 feet in the entrance channel and 10 feet in the anchorage area. In 1983, a controlling depth of 6 feet was in the channel to the mouth of the river. In 1980, 3½ feet was in the marina basin except for shoaling to bare in the N end and along the E side.

Leland River is a narrow crooked stream about 0.8 mile long which connects Lake Leelanau to Lake Michigan. A dam crosses the river about 400 feet above the mouth. The Main Street bridge 250 feet above the dam has a vertical clearance of about 4 feet. From this bridge to Lake Leelanau, the river is navigable by shallow-draft vessels.

Lake Leelanau is 16 miles long and as much as 1.8 miles wide. The upper and lower ends of the lake have good depths, but in the constriction near the middle of the lake at the village of Lake Leelanau, available depths are only 3 feet. A fixed highway bridge with a clearance of about 15 feet crosses the lake at the village.

Small-craft facilities.–A public dock constructed by the Michigan State Waterways Commission in the harbor provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and harbormaster services.

Ferry.–Mail and ferry service is available between Leland and North and South Manitou Islands from April through December with regular service. Irregular service is available from January through March depending on ice conditions. The terminal is on the E side of the Leland River mouth.

Good Harbor Bay, between Carp River Point and **Pyramid Point** 7.7 miles WSW, has deep water close to shore and affords protection in all but N to NE winds. However, in the NE part of the bay, an extensive rocky ledge with depths of 2 to 18 feet is 1 to 3 miles offshore.

Pyramid Point Shoal, with a least depth of 7 feet, extends 2 miles N from Pyramid Point. A buoy marks the N end of the shoal.

Sleeping Bear Bay lies between Pyramid Point and **Sleeping Bear Point** (44°54.9'N., 86°02.5'W.), 6.8 miles SW. The shores of the bay are generally deep-to, except for a rocky ledge with depths of 4 feet that extends 0.8 mile from shore 3 miles SW of Pyramid Point, which is bluff. The bay affords good shelter from NE through S to W winds. Very good holding ground is found under Pyramid Point. At **Glen Haven, Mich.,** a village on the SW side of the bay, the waterfront is in ruins and no services are available.

Sleeping Bear Shoal, with boulders covered 17 to 24 feet, extends 1.2 miles W from Sleeping Bear Point. Detached spots less than 30 feet extend 4 miles farther W from the point and are marked near the outer limit by a lighted bell buoy. Vessels using Manitou Passage should keep N and W of the buoy.

Manitou Passage, between North and South Manitou Islands and the mainland, is used by deep-draft vessels bound between Grays Reef Passage and the S end of Lake Michigan. The passage has good deep water and a least width of about 1.8 miles between Pyramid Point Shoal and North Manitou Shoals.

North Manitou Island, 6.5 miles N of Pyramid Point, is a hilly and wooded island 7 miles long N and S and 4.2 miles wide. A lee can be found under the island with generally good holding ground. The bight on the E side affords good shelter from W winds. The N shore is deep-to with several detached spots of 24 to 29 feet. The E shore is clear to within 0.4 mile and the W shore to within 0.6 mile. A shoal bank with depths of 4 to 15 feet extends 1.5 miles S from **Donner Point** at the SW end of the island and extends E to a point 2 miles S of **Dimmicks Point.** In 1981, numerous boulders were reported to exist from close inshore to about 0.4 mile offshore between Donner and Dimmicks Points. **North Manitou Shoals,** an area of foul ground with depths of 16 to 30 feet, extend 3 miles S of Dimmicks Point and 3.5 miles S of Donner Point. A buoy marks the extent S of Donner Point. **North Manitou Shoals Light** (45°01.2'N., 85°57.4'W.), 79 feet above the water, is shown from a white square structure 2.8 miles S of Dimmicks Point; a fog signal and radiobeacon are at the light.

South Manitou Island is 6.8 miles N of Sleeping Bear Point and 3.9 miles SW of North Manitou Island with a deep channel between. The island is hilly and bluff on the W side and lower and wooded on the E side. An abandoned lighthouse is on the SE point of the island. The shores of the island are relatively deep-to, except the S side where shoals with depths of 10 to 19 feet extend 1 mile offshore. A visible wreck is close to the SW shore of the island. Detached 18- and 19-foot spots are 1.5 miles S and 2.8 miles SW of the island, respectively. A lighted gong buoy is on the SW side of the 19-foot spot. **South Manitou Harbor,** on the SE side of the island, affords anchorage with good holding ground and protection from SW through N to NE winds.

Ferry.–Mail and ferry service is available between North and South Manitou Islands and Leland during most of the year, depending on ice conditions.

From Sleeping Bear Point, the shoreline trends S for 8 miles to a high rounding point known as **Empire Bluffs.** Shoals extend 0.7 mile offshore at the bluffs, and a detached 23-foot spot is 2 miles offshore. At **Empire, Mich.,** just N of the bluffs, two piers in ruins extend into the lake; in 1978, they were almost completely covered with sand.

From Empire Bluffs, the shoreline continues S and then bends W to **Platte River Point** at the mouth of the **Platte River. Platte Bay** is the bight between Empire Bluffs and Platte River Point. The shore of the bay is bluff with deep water close-to. A shoal, with rocks awash and a depth of 10 feet at the outer end, extends 1.5 miles N from Platte River Point.

Charts 14902, 14907.–From Platte River Point SW for 5.7 miles to Point Betsie, the shore is bold and hilly, and there are no outlying obstructions. **Point Betsie** is a rounding sandy point. **Point Betsie Light** (44°41.5′N., 86°15.3′W.), 52 feet above the water, is shown from a white cylindrical tower with a red roof and attached dwelling on the point. The light marks the turning point for vessels bound between Manitou Passage and the S end of Lake Michigan.

From Point Betsie, the shore continues sandy and hilly for 4.3 miles S to Frankfort Harbor.

Frankfort Harbor, 4.3 miles S of Point Betsie, is in Betsie Lake, connected to Lake Michigan by an entrance channel. The shore S of the entrance channel is bluff, reaching over 300 feet above the lake. The city of **Frankfort, Mich.,** is on the N side of Betsie Lake. A tank on a hill 0.75 mile NE of the harbor entrance is prominent from Lake Michigan.

Frankfort North Breakwater Light (44°37.8′N., 86°15.0′W.), 72 feet above the water, is shown from a square white pyramidal tower on the N side of the harbor entrance. An aerolight is 2.1 miles NE of the light.

Channels.–The harbor is entered from Lake Michigan through a dredged entrance channel between converging breakwaters to an outer harbor basin which is not adapted for anchorage but reduces wave action in the inner harbor. From the outer basin, the channel continues E between parallel piers to an inner basin and anchorage area in Betsie Lake. The outer ends of the breakwaters and piers are marked by lights.

In October 1984, the controlling depth was 23 feet in the entrance channel through the outer basin except for shoaling to 17 feet in the vicinity of Frankfort North Breakwater Light, thence 22 feet between the piers, thence 17 feet in the inner basin except for shoaling to 13 feet in the NW part and 16 feet in the SE corner, thence 9 feet in the anchorage area. The areas N and S of the entrance channel in the outer basin have least depths of 17 feet and 20 feet, respectively.

Betsie Lake, extends about 1.5 miles SE from the inner end of the entrance channel. Outside the dredged areas, the lake is generally shoal, with depths of 8 feet and less. The SE end of the lake is filled with submerged pilings, and at the extreme end, off the mouth of **Betsie River,** the lake is swampy. Anchorage in the lake is poor. A private channel extends from the inner harbor basin E through Betsie Lake to a private dock. In 1975, the controlling depth in the channel was 7 feet.

Bridges.–Betsie River is crossed near its mouth by a fixed highway bridge with a clearance of 4 feet and by a fixed railroad bridge with a 14-foot span and a clearance of 7 feet.

Currents.–Currents in the Frankfort Harbor entrance channel attain velocities up to 3 mph in either direction.

Frankfort Coast Guard Station is on the N side of the harbor entrance channel. A radiobeacon is at the station.

Harbor regulations.–A **speed limit** of 8 mph is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) Mooring to the breakwaters, piers, or revetments is prohibited.

A **special anchorage** area, marked by private buoys, is in Betsie Lake. (See **33 CFR 110.1 and 110.81a,** chapter 2, for limits and regulations.)

Wharves.–Koch Fuels, Inc. receives petroleum products at a 425-foot wharf on the S side of the inner basin. The wharf has a deck height of 8 feet with reported depths of 18 to 20 feet alongside. There is tank storage for 310,000 barrels of petroleum.

Small-craft facilities.–A public dock constructed by the Michigan State Waterways Commission on the N side of the inner basin provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and harbormaster services. A marine railway for small craft is available in the harbor.

From Frankfort S for about 19 miles to Portage Lake, the shore is bold and wooded with many hills from 300 to 400 feet high. The shore is deep-to except just S of the entrance to Arcadia Lake where depths under 24 feet extend 0.8 mile offshore. A submerged wreck is 0.5 mile offshore 6.6 miles S of Frankfort.

Arcadia Lake, 10 miles S of Frankfort, is an L-shaped lake separated from Lake Michigan by a narrow strip of land. The N arm of the lake has depths to 26 feet and deep-to shores. The larger S part of the lake has depths over 7 feet in the W end and shoals off into heavy weeds and marsh at the E end. At the SW end of the lake an entrance channel has been dredged from Lake Michigan.

Arcadia, Mich., is a village at the N end of Arcadia Lake about 14 miles S of Point Betsie.

Arcadia Lake is entered from deep water in Lake Michigan through a dredged entrance channel between parallel piers and revetments to the deep water inside the lake. A lighted fairway buoy marks the approach. In June 1985, the entrance channel had a controlling depth of 9 feet. The entrance channel is subject to extensive shoaling. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Small-craft facilities.–Water, gasoline, diesel fuel, electricity, a launching ramp, sewage pump-out facilities, and harbormaster services are available at the public dock at Arcadia. Gasoline, diesel fuel, sewage pump-out facilities, a launching ramp, and limited marine supplies are available at a marina just N. A 5-ton hoist is available for hull and engine repairs.

Charts 14907, 14939.–**Portage Lake,** 23 miles S of Point Betsie, is separated from Lake Michigan by a narrow strip of land. The lake, 3.3 miles long and 0.6 to 1.5 miles wide, has central depths of 14 to 60 feet with gradual shoaling toward shore. A shoal with depths of 7 to 12 feet near its outer end extends 0.4 mile S from North Point, about 0.9 mile E of the entrance channel. **Onekama, Mich.**, is a village on the N side of the lake at the E end.

Channels.–The dredged entrance channel leads from Lake Michigan between parallel piers and revetments to the deep water inside Portage Lake. The outer ends of the piers and the Portage Lake end of the S pier are marked by lights. In October 1984, the controlling depth in the entrance channel was 9 feet (9½ feet at midchannel). The channel is subject to shoaling from sand swept in by shore currents. The currents in the entrance channel attain velocities up to 3 mph in either direction.

Mooring to the piers and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Good anchorage is available in Portage Lake.

A **speed limit** of 8 mph (7 knots) is enforced in Portage Lake. (See **33 CFR 162.120**, chapter 2, for regulations.)

Small-craft facilities.–A marina on the S side of Portage Lake just E of Eagle Point provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and marine supplies. A 14-ton mobile hoist and a 50-ton marine railway are available for hull and engine repairs. In 1978, there were reported depths of 5 to 12 feet alongside the docks and 10 feet alongside the fuel pumps.

Chart 14907.–From Portage Lake SSW for 8.3 miles to Manistee, the shore continues somewhat bluff, generally 60 feet high, with several hills 115 to 180 feet high. The 18-foot contour is no more than 0.4 mile offshore.

Charts 14907, 14938.–**Manistee Harbor**, 31 miles S of Point Betsie, is on the **Manistee River**, which flows from the N end of Manistee Lake for 1.5 miles to Lake Michigan. There are extensive facilities along both sides of the river and on the W side of Manistee Lake. The principal cargo handled is coal, with occasional shipments of salt and machinery. The harbor is also a base for fish tugs. A radio mast at the N end of Manistee Lake is prominent.

Manistee North Pierhead Light (44°15.1'N., 86°20.8'W.), 55 feet above the water, is shown from a white cylindrical tower on the outer end of the N pier; a fog signal and radiobeacon are at the light.

Channels.–The entrance to Manistee River is protected on the SW by a breakwater. A dredged entrance channel leads from deep water in Lake Michigan on the N side of the breakwater to an outer harbor basin, thence between parallel piers through the mouth of the river and upstream for 1.6 miles to Manistee Lake. The outer ends of the breakwater and piers are marked by lights.

In May-June 1984, the controlling depths were 23 feet in the entrance channel through the outer basin and between the piers, thence 19 feet (22 feet at midchannel) to Manistee Lake.

Currents in the river attain velocities up to 3 mph in either direction.

Numerous submerged pile clusters extend along the N channel limit from the outer end of the N pier to its inner end. Large pile clusters protect each end of the revetment upstream of the N pier.

The outer basin, enclosed by the S breakwater and N pier, is not adapted for anchorage, but reduces wave action in the inner harbor. Mooring to the breakwater, piers, or revetments is prohibited. Large riprap stones are along both sides and across the ends of the breakwater and pier, and navigation should not be attempted close to these structures.

Manistee Lake, about 4 miles long and up to 0.5 mile wide, has depths to 50 feet, with the shores generally deep-to. Buoys mark the outer ends of shoals and submerged dock ruins from the inner end of Manistee River S in the lake. Good anchorage is in the N part of the lake in depths of 20 to 25 feet.

Big Manistee River, entering Manistee Lake at its N end, flows through a flat valley with numerous cutoffs and sloughs, and is crossed by a number of fixed bridges. The channel is tortuous, with depths varying from 1½ to 11 feet to a dam which crosses the river about 30 miles above the mouth.

Caution.–A 140-foot barge, partially submerged in 18 feet of water, is about 300 yards 265° from Manistee South Pierhead Light.

Bridges.–Maple Street bridge, about 1.1 miles above the mouth of Manistee River, has a bascule span with a clearance of 23 feet. U.S. Route 31 bridge, 1.4 miles above the mouth, has a bascule span with a clearance of 32 feet. The Chesapeake and Ohio Railway bridge, 1.5 miles above the mouth, has a swing span with a clearance of 13 feet. (See **33 CFR 117.1 through 117.59 and 117.637**, chapter 2, for drawbridge regulations.) An overhead power cable at the head of the river has a clearance of 145 feet.

Manistee Coast Guard Station, seasonally operated, is on the N side of the entrance to Manistee Harbor.

Harbor regulations.–Harbor regulations have been established by the city of Manistee and are enforced by the **harbormaster**. Copies of regulations may be obtained from the Chief of Police at City Hall. A **slow-no wake speed** is enforced in the Manistee River. Federal regulations specify an 8 mph (7 knots) **speed limit** for vessels over 40 feet in length. (See **33 CFR 162.120**, chapter 2, for regulations.)

Wharves.–Manistee has several deep-draft facilities. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

Sievert Brothers, Inc. Wharf: S side of the head of Manistee River; 850-foot face; 12 to 21 feet alongside; deck height, 8 to 9 feet; open storage for 80,000 tons of material; receipt of sand, gravel, limestone, and coal; shipment of salt; owned and operated by Sievert Brothers, Inc.

Morton Salt Co. Coal Dock: (44°14'36"N., 86°18'29"W.); deck height, 3 feet; self-unloaders lay off dock and discharge by boom; receipt of coal;

owned and operated by Morton Salt Division, Morton-Norwich Products.

Morton Salt Co. Dock: across slip S of Coal Dock; 250-foot face; covered storage for 12,000 tons of salt; shipment of salt; owned and operated by Morton Salt Division, Morton-Norwich Products.

Hardy Salt Co. Dock: (44°13'51"N., 86°18'06"W.); about 800 feet of berthing space; 15 to 18 feet alongside; deck height, 4 feet; open storage for 40,000 tons of coal; receipt of coal; owned and operated by Hardy Salt Co.

Packaging Corp. of America Dock: (44°13'11"N., 83°17'22"W.); 325-foot N side, 24 feet alongside; 344-foot E side, 24 feet alongside; 370-foot S side, 23 feet alongside; shipment of machinery and bulk cargoes; owned by Packaging Corp. of America and operated by various operators.

Small-craft facilities.–A public dock constructed by the Michigan State Waterways Commission on the S side of the Manistee River just inside the mouth provides transient berths, gasoline, water, electricity, sewage pump-out, and harbormaster services. Diesel fuel is available at a marina on the N side of the river 0.7 mile above the mouth. A marina at the N end of Manistee Lake has a 20-ton marine railway for hull and engine repairs.

Chart 14907.–From Manistee SSW for 16 miles to Big Sable Point, the shore is bluff, with a few hills. The 18-foot contour is about 0.4 mile offshore. **Big Sable Point,** 45 miles S of Point Betsie, has a low shoreline with hills rising inland. **Big Sable Light** (44°03.5'N., 86°30.9'W.), 106 feet above the water, is shown from a conical tower, white with middle third and top black, with an attached dwelling on the point.

From Big Sable Point SSE for 7.5 miles to Ludington, the shore is clear to within 0.5 mile. The land in this stretch is generally low, except in the vicinity of Lincoln Lake where the bluffs reach 120 to 180 feet in height. **Big Sable River,** the outlet of Hamlin Lake, flows into Lake Michigan 2 miles S of Big Sable Point. A dam crosses the river about 0.8 mile above the mouth.

Charts 14907, 14937.–Ludington Harbor is in Pere Marquette Lake, 7.5 miles S of Big Sable Point. The city of **Ludington, Mich.,** is on the N side of the lake.

Prominent features.–Prominent are the lighted stack at Dow Chemical U.S.A., 1.7 miles ESE of the harbor entrance, and Father Marquette Memorial Cross, 1.1 miles SE of the entrance.

Ludington North Breakwater Light (43°57.2'N., 86°28.2'W.), 55 feet above the water, is shown from a white square pyramidal tower on the outer end of the N breakwater; a fog signal is at the light.

Channels.–A dredged entrance channel leads E from deep water in Lake Michigan between converging breakwaters to an outer harbor basin. The outer ends of the breakwaters are marked by lights. From the basin, the channel leads to the N end of Pere Marquette Lake. The N side of the channel is protected by a pier and revetment. In April 1980, a pier and revetment were under construction along the S side of the channel. The piers are marked at their outer ends by lights, and a fog signal is at the North Pierhead Light; a radiobeacon is at the inner end of the N pier.

In June-July 1984, the controlling depths were 28 feet, except for shoaling along the edges, from deep water in the lake through the channel to Pere Marquette Lake. Rocks, covered 23 feet in April 1982, extend about 100 yards W and NW from the end of the S breakwater. In July 1982, 18 feet was available in the S outer basin, except for shoaling to 4 feet along the edges, with 18 feet available in the N basin in 1980.

The outer basin is not adapted for anchorage of vessels, but reduces wave action in the inner harbor. Mooring to the breakwaters, piers, and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Pere Marquette Lake is about 2 miles long, including a marsh at the S end, has an average width of 0.5 mile, and is up to 43 feet deep. The anchorage is good. **Pere Marquette River,** which flows into the S end of Pere Marquette Lake, is not navigable above the lake except for rowboats and small launches.

A buoy marks the outer end of submerged dock ruins on the W side of Pere Marquette Lake. Buoys mark the N side of the channel leading to the small-craft facilities in the inlet on the NE side of the lake.

Caution.–NW and SW winds make entry between the breakwaters hazardous. Vessels usually increase their speed until just inside the breakwaters to compensate. Small-craft operators transiting from S to N have reported that South Breakwater Light is sometimes difficult to see because of the brilliance of North Breakwater Light.

Bridges.–A fixed highway bridge with a clearance of 12 feet crosses the inlet on the NE side of Pere Marquette Lake.

Coast Guard.–Ludington Coast Guard Station is on the N side of the harbor entrance. **Storm warning signals are displayed.** (See charts.)

Harbor regulations.–A **speed limit** of 8 mph (7 knots) is enforced when entering or leaving Ludington Harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) A **slow-no wake speed** is enforced on Pere Marquette River.

Wharves.–Ludington has five deep-draft facilities. (For complete information on the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

Laman Asphalt and Paving Co. Wharf: (43°57'04"N., 86°27'08"W.); 900-foot face; 23 feet alongside; deck height, 7 feet; open storage for 45,000 tons of stone; receipt of stone and construction aggregates; owned by Chessie System and operated by Laman Asphalt and Paving Co., Inc., and C-way Construction Co.

Western Concrete Products Co. Wharf: (43°56′49″N., 86°26′27″W.); 430-foot face; 18 feet alongside; bank height, 0 to 3 feet; open storage for 40,000 tons of stone; receipt of sand and stone; owned by J.P. Burroughs and operated by Western Concrete Products Co.

Dow Chemical, West Wharf: (43°56′28″N., 86°26′30″W.); 1,500-foot face; 30 feet alongside; deck height, 3½ feet; open storage for 400,000 tons of limestone; receipt of limestone; owned and operated by Dow Chemical U.S.A.

Dow Chemical, East Wharf: (43°56′20″N., 86°26′23″W.); 550-foot face; 30 feet alongside; deck height, 3½ feet; receipt and shipment of petroleum products; shipment of liquid calcium chloride; owned and operated by Dow Chemical U.S.A.

Sand Products Corp. Dock: 0.3 mile SW of Dow Chemical, West Wharf; 750 feet of berthing space along dolphins; 27 feet alongside; deck height, 5 feet; open storage for 24,000 tons of material; shipment of sand; owned by Dow Chemical U.S.A. and operated by Sand Products Corp.

Small-craft facilities.–A marina developed by the Michigan State Waterways Commission is on the N side of Pere Marquette Lake, N of Car Ferry Slip No. 1. Transient berths, gasoline, diesel fuel, electricity, water, and sewage pump-out facilities are available. Marinas in the NE arm of Pere Marquette Lake provide transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and launching ramps. A 20-ton hoist and marine railways to 30 tons are available. Hull and engine repairs are available at the N end of the lake near the entrance.

Ferries.–Ferry service is available from Ludington to Milwaukee, Manitowoc, and Kewaunee, and return during the summer for autos and passengers. Reservations are advised for autos. Railroad cars are ferried throughout the year. The terminal is about 1 mile SE of the harbor entrance.

Chart 14907.–From Ludington S for 12 miles to Pentwater, the shore is bluff, with hills reaching 150 to 250 feet high. The shoal border is regular, and there are no outlying dangers. At the Ludington Pumped Storage Hydroelectric Plant, 4 miles S of Ludington, two jetties extend from shore and are attached by log booms to a detached breakwater. These structures are marked by private lighted buoys, and navigation should not be attempted close to them. The outlet of **Bass Lake,** 8.5 miles S of Ludington, is blocked by a dam at the Lake Michigan shoreline, and its water level is about 3 feet above Low Water Datum.

Pentwater Harbor, serving the town of **Pentwater, Mich.,** is in Pentwater Lake, 20 miles S of Big Sable Point. Pentwater Lake is connected to Lake Michigan by a dredged entrance channel.

Channels.–The dredged entrance channel leads from deep water in Lake Michigan SE between piers and revetments to the N end of Pentwater Lake. The outer ends of the piers are marked by lights. In June 1985, the controlling depths were 12 feet in the approach channel, thence 10 feet (11 feet at midchannel) to Pentwater Lake. Currents in the channel attain velocities up to 3 mph in either direction.

Mooring to the piers and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Pentwater Lake, about 2 miles long and 0.5 mile wide with depths of 25 to 50 feet, provides good anchorage. **Pentwater River,** at the head of the lake, has depths of 1 foot and is crossed by a highway bridge at the mouth.

A **slow-no wake speed** is enforced in Pentwater Lake and in the entrance channel. Federal regulations specify an 8 mph (7 knots) **speed limit** for vessels over 40 feet in length. (See **33 CFR 162.120,** chapter 2, for regulations.)

Small-craft facilities.–A public dock constructed by the village and the Michigan State Waterways Commission in the NW part of Pentwater Lake SE of the entrance channel provides transient berths, gasoline, diesel fuel, water, sewage pump-out, and electricity. A marina just SE provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and limited marine supplies. A 16-ton hoist is available for hull and engine repairs.

From Pentwater Harbor, the shore trends SW for 10 miles to Little Sable Point. This stretch is a continuous line of bluffs with a regular shoal border and several off-lying wrecks. A wreck, covered 18 feet, is 0.5 mile offshore 2 miles SW of Pentwater Harbor, and a wreck, covered 1 foot and marked by a buoy, is close to shore 7 miles SW of the harbor. **Little Sable Point** is a broad rounding point 28 miles S of Big Sable Point. **Little Sable Light** (43°39.2′N., 86°32.4′W.), 108 feet above the water, is shown from a conical red brick tower on the point.

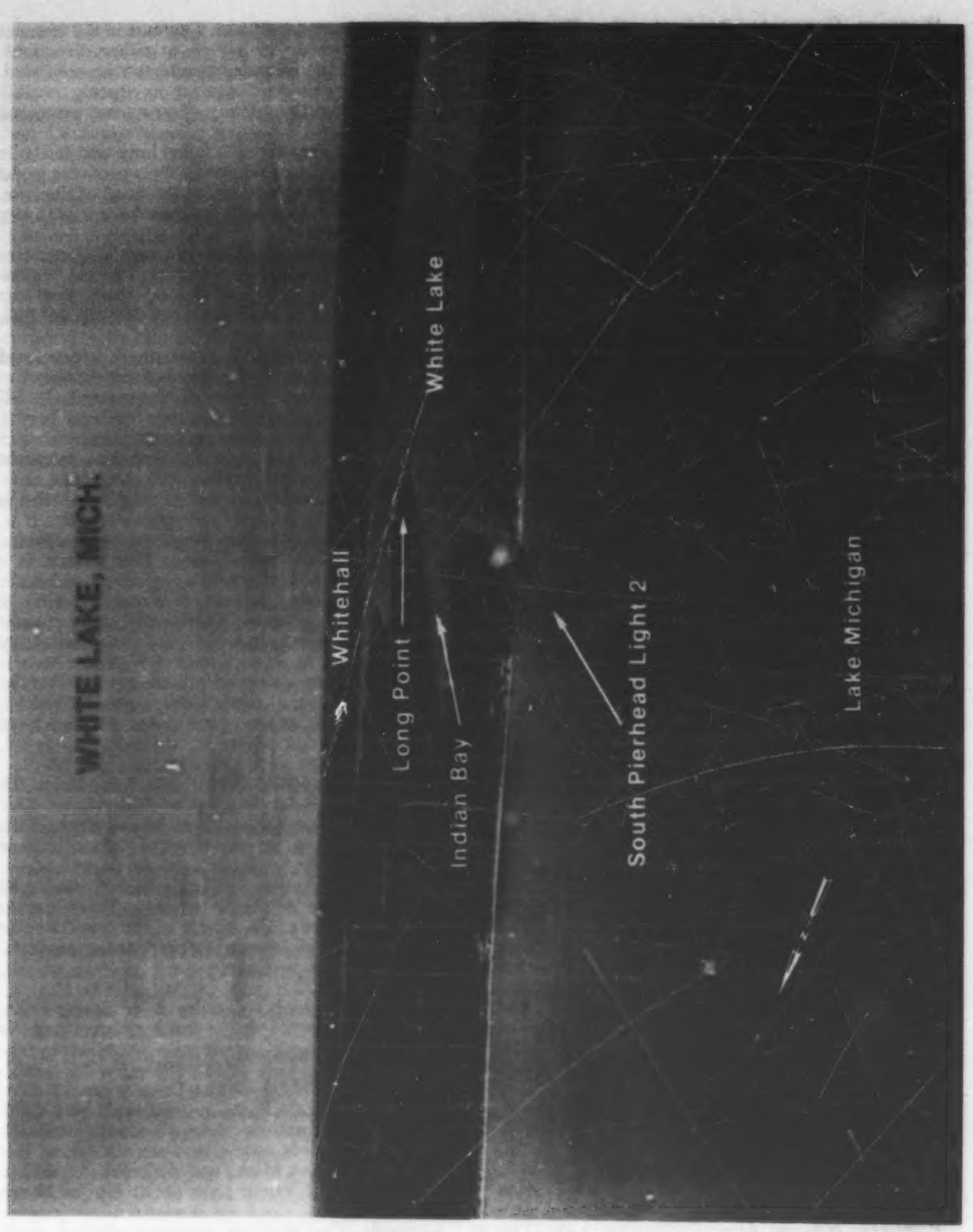
Charts 14907, 14906.–From Little Sable Point, the shore trends SSE for 20 miles to White Lake. This stretch is quite rugged, with no shoals beyond 0.5 mile from shore. A wreck, covered ½ foot, is close to shore 0.8 mile S of Little Sable Light.

Stony Lake, 6.5 miles S of Little Sable Point has its outlet into Lake Michigan through **Stony Creek.** Rows of old piles at the mouth of the creek are the only remainder of former lumber loading facilities. The creek is not navigable.

Chart 14906.–About 4 miles S of Stony Lake, several hills from 125 to 245 feet high are along the shore.

Charts 14906, 14935.–White Lake, about 20 miles SSE of Little Sable Point, is separated from Lake Michigan by a narrow strip of sandy bluffs. A dredged cut affords access between the lakes. The towns of **Montague, Mich.,** and **Whitehall, Mich.,** are at the NE end of White Lake about 4 miles above the cut.

Channels.–The dredged entrance channel leads from deep water in Lake Michigan between parallel piers and revetments to the W end of White Lake. The outer ends of the piers and the inner end of the



WHITE LAKE, MICH.

S pier are marked by lights. The outer end of the channel between the piers is subject to extensive shoaling. In April 1984, the channel had a controlling depth of 11 feet. Currents in the channel attain velocities up to 3 mph in either direction.

Mooring to the piers and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

In White Lake, at the inner end of the dredged channel, the channel bends SE around the shoal off **Indian Point.** The W side of the shoal is marked by a buoy, and the SE edge of the shoal is marked by a lighted buoy. The lake has central depths of 25 to 70 feet with shoals extending as much as 0.6 mile from shore. Lighted buoys at the outer edges of the shoals mark the deep water through the lake to its head. **White River** flows into the head of the lake between Montague and Whitehall. The bar at the mouth of the river has depths of 2 feet.

Anchorages.–The preferred anchorages in White Lake are in the NW end of the bay in the upper part of Indian Bay in depths of 25 to 30 feet, mud bottom; in the SW part of the lake W of the yacht club in 10 to 25 feet, sand bottom; and in the NE end of the lake S and W of the city dock in 8 to 10 feet, mud bottom.

Bridges.–A fixed highway bridge and a fixed railroad bridge, with a reported least clearance of 4 feet, cross White River just above the mouth.

A **speed limit** of 8 mph (7 knots) is enforced in White Lake. (See **33 CFR 162.120,** chapter 2, for regulations.)

Hooker Chemicals and Plastics Corp. ships caustic soda from a facility on the N shore of White Lake 2.4 miles ENE of Indian Point. The offshore wharf has a deck height of about 11 feet and provides 150 feet of berthing space along dolphins. The reported depth alongside is 20 feet. The facility has tank storage for 1½ million gallons.

Small-craft facilities.–Marinas at Montague and Whitehall provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Hoists to 30 tons and a 15-ton marine railway for boats to 38 feet are available for hull, engine, and electronic repairs.

Chart 14906.–From White Lake, the shoreline continues SSE for 11 miles to Muskegon Lake. The shore consists of low sand bluffs and wooded hills, and is clear of shoals to within 0.6 mile.

Charts 14906, 14934.–Muskegon Harbor, 31 miles SSE of Little Sable Point, consists of Muskegon Lake and a dredged entrance channel which connects it with Lake Michigan. Facilities for a wide range of commerce are on the S shore of the harbor at the city of **Muskegon, Mich.,** and at its E end.

Prominent features.–A lighted stack of the Consumers Power Co. at the mouth of the Muskegon River in 43°15'16"N., 86°14'23"W. is prominent from Lake Michigan. Sandhills N and S of the harbor entrance may obstruct the stack from some directions.

Muskegon South Breakwater Light (43°13.5'N., 86°20.8'W.), 70 feet above the water, is shown from a red pyramidal tower on the outer end of the S breakwater; a fog signal is at the light.

Channels.–The dredged entrance channel leads from deep water in Lake Michigan between converging breakwaters to an outer basin, thence between piers and revetments to Muskegon Lake. The outer ends of the breakwaters and piers, and the inner ends of piers, are marked by lights. A fog signal and a radiobeacon are at the light on the S pier. In 1983-March 1985, the controlling depths were 21 feet in the approach channel except for shoaling to 19 feet along the flared edges, thence 28 feet through the outer harbor, thence 25 feet between the piers and revetments to Muskegon Lake.

Currents in the channel attain velocities up to 3 mph in either direction.

The outer basin is not adapted for anchorage of vessels, but reduces wave action in the entrance channel.

Mooring to the breakwaters, piers, and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Muskegon Lake is about 4 miles long and varies from 2 miles wide at the W end to as little as 0.6 mile in the E part. The lake has central depths of 25 to 79 feet. Near midlength of the lake, shoals marked at the outer edges by lights extend from the N and S shores and restrict the available width of deep water to 1,600 feet. There are many obstructions in the shallow parts of the lake, including cribs, pipelines, and submerged pilings and dock ruins.

Muskegon River flows into the NE end of Muskegon Lake through two channels. Through the main channel, at a river stage of about 2 feet above extreme low water, depths are 2½ to 9 feet for 33 miles above the mouth to the former dam at **Newaygo, Mich..** The river is navigable by small craft that can pass under the bridges. The least clearance is 5 feet.

Bear Lake parallels the NW side of the NE end of Muskegon Lake and has its outflow through a narrow channel into its N side. **North Muskegon, Mich.,** is the community on the peninsula between the two lakes.

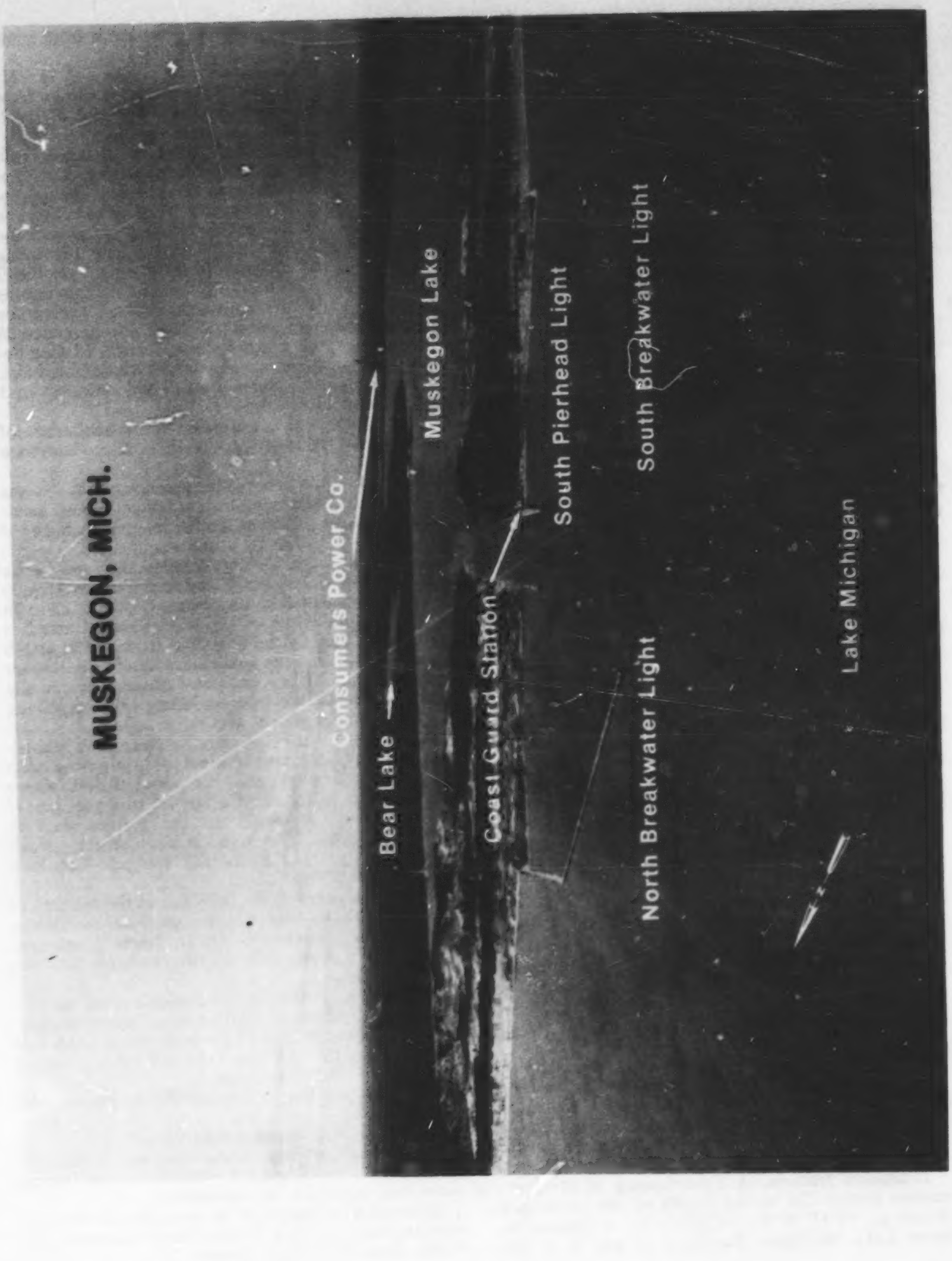
Anchorage.–Muskegon Lake affords good anchorage, generally sand or mud bottom. Special anchorages are in the SW part of the lake and on the S side at Muskegon. (See **33 CFR 110.1 and 110.81,** chapter 2, for limits and regulations.)

Weather.–(See page T-10 for **Muskegon climatological table.**)

Muskegon is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)



MUSKEGON, MICH.

Coast Guard.–Muskegon Coast Guard Station is on the S side of the harbor entrance channel. A Coast Guard **Captain of the Port** office is in Muskegon. (See appendix for address.)

Harbor regulations.–A **speed limit** of 8 mph is enforced in Muskegon Harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) A **slow-no wake speed** is enforced in the Bear Lake entrance channel.

Wharves.–Muskegon has numerous deep-draft facilities along the S shore of Muskegon Lake. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths for the facilities described are reported depths. (For information on the latest depths, contact the operators.)

S. D. Warren Co., Central Mill Coal Slip: (43°13'00"N., 86°18'29"W.); 500-foot faces, E and W sides; 24 feet alongside; natural bank height, 4 to 5 feet; open storage for 255,000 tons of material; receipt of limestone and coal; owned and operated by S. D. Warren Co.

Great Lakes Dock and Materials Co. Pier: (43°13'20"N., 86°17'27"W.); 450-foot N side, 650-foot E side, along mooring dolphins; 25 feet alongside; deck height, 9 feet; open storage for 100,000 tons of material; receipt of limestone and other bulk materials; owned by John H. Bultema and operated by Great Lakes Dock and Materials Co.

Amoco Oil Co. Wharf: 0.4 mile E of Great Lakes Dock and Materials Co. Pier; 475-foot face; 18 feet alongside; deck height, 6 feet; tank storage for 466,000 barrels; receipt of petroleum products; owned and operated by Standard Oil Division of Amoco Oil Co.

Huron Cement Pier: (43°14'02"N., 86°15'40"W.); 529-foot face, 555 feet with dolphins; 19 to 23 feet alongside: deck height, 6 feet; storage silos for 12,000 tons of cement; receipt of bulk cement; owned and operated by Huron Cement Division of National Gypsum Co.

Lakeshore Contractors Dock: across slip E of Huron Cement Pier; 540 feet of berthing space with dolphins; 18 to 22 feet alongside; deck height, 8 feet; receipt and shipment of construction materials; owned and operated by Lakeshore Contractors, Inc.

West Michigan Dock and Market Corp., Northwest Dock: 0.3 mile N of Lakeshore Contractors Dock; 930-foot W face, berths 3 and 4; 420-foot NW face, berth 5; 21 to 30 feet alongside; deck heights, 6 and 5 feet; 74,000 square feet covered storage; 5 acres open storage; 15-ton gantry crane; receipt of limestone, pig iron, and dry bulk commodities and shipment of scrap metal; owned and operated by West Michigan Dock and Market Corp.

West Michigan Dock and Market Corp., Northeast Dock: W side of slip adjacent to Northwest Dock, berth 5; 784-foot face; 27 feet alongside; deck height, 6 feet; 57,000 square feet covered storage; receipt of limestone, pig iron, and dry bulk materials; owned and operated by West Michigan Dock and Market Corp.

B. C. Cobb, Power Plant Wharf: N side of mouth of Muskegon River; 1,380 feet of berthing space along dolphins; 26 to 33 feet alongside; deck height, 8½ feet; 22 acres open storage; receipt of coal; owned and operated by Consumers Power Co.

Naph-Sol Refining Co. Dock: (43°15'09"N., 86°14'57"W.); 350 feet of berthing space along dolphins; 20 feet alongside; deck height, 4 feet; storage tanks for 387,000 barrels; receipt of liquid fertilizer; owned and operated by Naph-Sol Refining Co.

Small-craft facilities.–Public docking facilities are available midlength of the S lakeshore at the Hartshorn Municipal Marina, jointly constructed by the city and the Michigan Waterways Commission. Gasoline, diesel fuel, water, electricity, a launching ramp, sewage pump-out facilities, and harbormaster services are available. A marina on the N shore, at the outlet of Bear Lake, has limited transient berths, gasoline, water, electricity, diesel fuel, sewage pump-out facilities, and limited marine supplies. A 30-ton mobile hoist is available for engine repairs, and limited hull and electronic repairs.

Communications.–Muskegon has good highway and rail connections. The city is served by Muskegon County Airport S of the city.

Chart 14906.–From Muskegon, the shore extends SSE for 12.5 miles to Grand Haven. The N 5 miles of this reach has hills to 205 feet high; the remainder of the stretch is lower. Deep water is about 0.5 mile offshore.

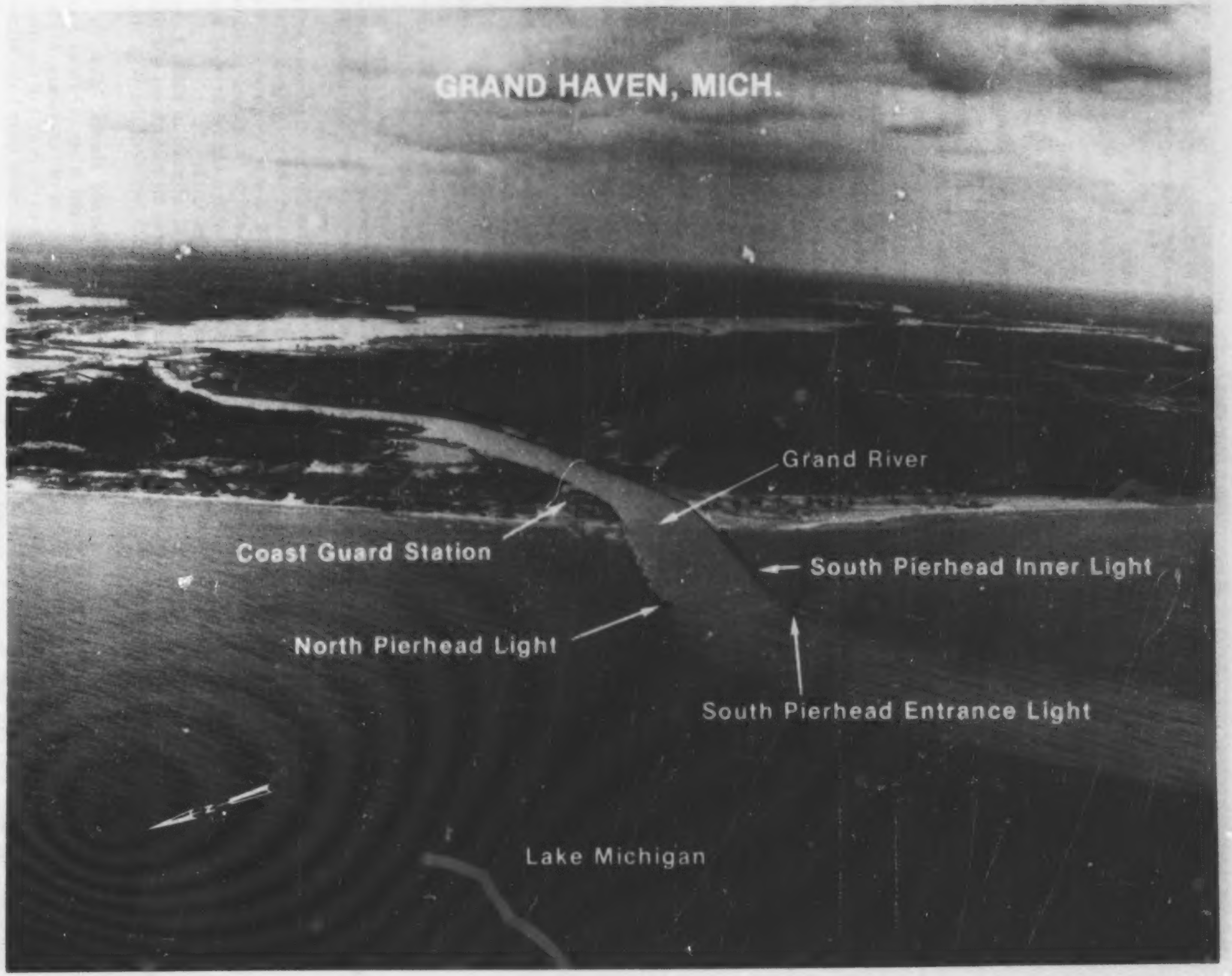
Mona Lake, a small body of water 4.8 miles S of Muskegon, has several summer resorts and is used by small recreational craft. This narrow lake is about 3.5 miles long with general depths of 18 to 40 feet. It empties into Lake Michigan through a slightly winding channel at the W end. In 1971, the controlling depth in the channel was 3 feet, but it is at times entirely closed by sandbars. The ruins of two piers protect the entrance. The N pier is almost entirely washed away, and the S pier is gone except for a double row of piles extending from a point 50 feet out in the lake to a point about 450 feet inside. The banks rise steeply from each shore.

A highway bridge with a 29-foot draw span and a clearance of 12 feet crosses the inner end of the entrance channel. In 1978, it was reported that the bridge was being maintained in the closed position. A fixed highway bridge with a clearance of 18 feet crosses the lake 1.5 miles farther E.

A **slow-no wake speed** is enforced in Mona Lake. A restricted navigation area for motorboats is within 100 feet of shore for 1,025 feet E of the W bridge.

Charts 14906, 14933.–Grand Haven, Mich., is a city and harbor on the **Grand River,** 43 miles S of Little Sable Point. The towns of **Ferrysburg, Mich.,** and **Spring Lake, Mich.,** front the N side of the river. These communities are not visible from Lake Michigan because of sand dunes and hills immediately N and S of the harbor entrance. The principal commodities handled in the port are coal and sand.

Grand Haven South Pierhead Entrance Light


GRAND HAVEN, MICH.
Grand River
Coast Guard Station
South Pierhead Inner Light
North Pierhead Light
South Pierhead Entrance Light
Lake Michigan
N

(43°03.5'N., 86°15.4'W.), 42 feet above the water, is shown from a red fog signal building on the outer end of the S pier; a fog signal and a radiobeacon are at the light.

Channels.–The dredged entrance channel leads E from deep water in Lake Michigan between parallel piers at the mouth of Grand River and upstream for about 16 miles. The outer ends of the piers are marked by lights. South Pierhead Entrance Light and an inner light on the S pier form a range useful for approaching the harbor. There is a turning basin on the S side of the channel 2.3 miles above the mouth, and 2.7 miles above the mouth a side channel extends N to the deep water in Spring Lake. In March-June 1985, the midchannel controlling depths were 22 feet in the approach channel to inside the piers, thence 21 feet at midchannel to the railroad bridge at Ferrysburg, thence 12 to 18 feet in the turning basin, thence in 1978, 15 feet from the railroad bridge to the entrance channel to Spring Lake, thence in June-July 1980, 12 feet into Spring Lake, thence 1½ feet from the Spring Lake channel to the C-Way Construction Co. gravel pits at Bass River. The channel limits from Ferrysburg to the upstream project limit are well marked by buoys. The channels are subject to shoaling.

Large riprap stones have been placed along the lakesides and ends of the piers, and navigation should not be attempted close to these structures. Mooring to the piers or revetments is prohibited.

The Grand River is not maintained above the junction with Bass River. Conditions are unknown, but depths probably do not exceed 2 to 3 feet at extreme low water for 23.5 miles upstream to Grand Rapids. Only small recreational craft navigate this section of the river.

The lower part of Grand River has connecting shallow side channels separated from the main river by low marshy islands. Several connected bayous, or bays, have very shallow entrances with deep water inside. **South Channel,** the farthest downstream of the side channels, cuts across a bend in the river between points about 1.2 and 3.3 miles above the mouth and has a controlling depth of 3 feet.

Spring Lake, extending N and connected to the Grand River at Ferrysburg, has depths of 19 to 42 feet except for shoaler depths at its head.

Currents.–High-water periods on the Grand River are usually for two months during the spring. During these periods, currents may reach 3 to 5 mph.

Grand Haven is a **customs station.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Grand Haven Coast Guard Station is on the N side of the harbor entrance channel.

Harbor regulations.–Federal regulations specify a **speed limit** of 8 mph (7 knots) in Grand Haven harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) State regulations specify a **slow-no wake speed** on the following waters: in Grand River, from the mouth to the junction with South Channel, from 3,200 feet below to 1,000 feet above the Grand Trunk Western Railroad bridge, within 200 feet of the N shore from the junction with Spring Lake E for 4,000 feet, within 300 feet of the S shore from the junction with Spring Lake to the upper junction with South Channel, from the confluence with Indian Channel upstream for 3,500 feet, in the river bend in the vicinity of Millhouse Bayou, and for a stretch of 4,000 feet in the vicinity of Grand Valley Marina about 12 miles above the river mouth; in South Channel; in Pottawattomie Bayou; in Millhouse Bayou; in the entrance to Spring Lake; in Spring Lake, adjacent to the towns of Ferrysburg and Spring Lake for vessels 26 feet in length or more, and within 200 feet of shore of these towns for vessels less than 26 feet in length; in Smith Bayou; in Pettys Bayou; in Cornelius Bayou; and in Stahl Bayou.

Local harbor regulations are under the control of the city manager and enforced by the **harbormaster.** Copies of the regulations can be obtained from the City Manager, City Hall, 519 Washington Street, Grand Haven, Mich. 49417.

Wharves.–Grand Haven has several deep-draft facilities in the lower 2 miles of Grand River. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.)

J.B. Sims Power Plant Dock: E side of river just above junction with South Channel; 437-foot face; 17 feet alongside; deck height, 6 feet; open storage for 70,000 tons of coal; receipt of coal; owned and operated by City of Grand Haven, Board of Light and Power.

Construction Aggregates Corp. Wharf: W side of river 0.5 mile above South Channel; 350 feet of berthing space along dolphins; 20 feet alongside; deck height, 7 feet; vessel loading conveyor, rate 3,200 tons per hour; shipment of sand; owned and operated by Construction Aggregates Corp.

Verplanks Coal and Dock Co. Wharf: N side of river 0.5 mile above Construction Aggregates Corp. Wharf; 2,200 feet of natural and improved bank; 21 feet alongside; deck height, 4 feet; open storage for 200,000 tons of material; receipt of coal and bulk aggregates; owned by Verplanks Coal and Dock Co. and operated by Verplanks Coal and Dock Co. and Grand Haven Materials Terminal.

Small-craft facilities.–Grand Haven has numerous small-craft facilities along both sides of Grand River, in South Channel, and in Spring Lake. The public docking facility, constructed by the city and the Michigan State Waterways Commission, is on the E side of the river just below the junction with South Channel. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, and launching ramps are available in

Structures across Grand River to Grand Rapids

**Miles above South Pierhead Entrance Light*

***Clear width in feet proceeding upstream*

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
	Main Channel							
	Junction with South Channel		1.38					
1	Grand Trunk Western RR bridge	Railroad	2.80	60	61		9	Swing. Note 1.
2	U.S. Route 31 bridge	Highway	2.89			155	25	Bascule. Note 1.
3	Overhead cable	Power	2.94				133	
	Junction with mouth of Spring Lake		3.04					
4	Overhead cable	Power	6.45				90	
5	Overhead cable	Power	12.60				80	
	Junction with Bass River		17.38					
6	Overhead cable	Power	17.40				53	
7	Overhead cable	Power	19.39				74	
8	68th Ave. bridge	Highway	19.40	76	76	76	22	Fixed.
9	Bridge St. Rd. bridge	Highway	25.20	85	85		19	Fixed.
10	Overhead cable	Power	25.21				39	
11	Grandville bridge	Highway	33.90	69	69		24	Fixed.
12	Overhead cable	Power	37.20				43	
13	ConRail bridge	Railroad	37.20		54		17	Swing. Note 2.
14	Overhead cable	Power	39.22				40	
15	Overhead cable	Power	39.26				50	
16	Overhead cable	Power	39.31				80	
17	Overhead cable	Power	39.33				40	
18	Overhead cable	Power	39.36				80	
19	Overhead cable	Power	39.48				80	
20	Overhead cable	Power	39.50				70	
21	Michigan Ry. bridge	Railroad	39.50	70	70		27	Swing. Navigable channel through right draw. Note 2.
22	Overhead cable	Power	39.52				70	
23	Overhead cable	Power	39.79				59	
24	Wealthy St. bridge	Highway	39.80		70		19	Swing. Note 2.
25	Chesapeake & Ohio Ry. bridge	Railroad	39.90		70		19	Swing. Note 2.
26	Fulton St. bridge	Highway	40.00					Head of navigation.
	South Channel							
	Junction with Main Channel		1.38					
27	Overhead cable		1.83					Data not available.
28	Third St. bridge	Highway	1.84			23	9	Fixed.
29	Overhead cable		1.85					Data not available.
30	Overhead cable		1.92					Data not available.
31	Overhead cable		2.00					Data not available.
32	Grand Trunk Western RR bridge	Railroad	2.01				9	Fixed.
33	Overhead cables		2.16					Data not available.
34	U.S. Route 31 bridge	Highway	2.25				17	Fixed.
35	Overhead cable	Power	2.26				49	
36	Overhead cable		2.32					Data not available.
	Junction with Main channel		2.87					

Structures across Grand River to Grand Rapids (Continued)

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
	Spring Lake Channel							
	Junction with Main channel		3.04					
37	Route 104 bridge	Highway	3.15			111	35	Fixed.
38	Overhead cable	Power	3.21				113	
39	Grand Trunk Western RR bridge	Railroad	3.23	59	59		7	Swing. Note 1.

Note 1.–See **33 CFR 117.1 through 117.59 and 117.633,** chapter 2, for drawbridge regulations.
Note 2.–See **33 CFR 117.1 through 117.49,** chapter 2, for drawbridge regulations.

the harbor. Lifts to 50 tons are available for hull and engine repairs.

Chart 14906.–From Grand Haven, the shore trends S for 11 miles to Port Sheldon. This stretch is partially wooded with rolling terrain and several hills in the N part 140 to 200 feet high. There is deep water within 0.5 mile of the shore.

Port Sheldon is a small harbor in **Pigeon Lake** 55 miles S of Little Sable Point. Pigeon Lake is connected to Lake Michigan by a entrance channel constructed by Consumers Power Co. The channel is protected by two piers, each marked at the outer end by a private light. The primary purpose of the channel is to provide cooling water for the powerplant on the N side of the lake. In 1978, the reported controlling depth in the channel was 8 feet. Mariners entering the harbor do so at their own risk and are requested not to dispose of waste in Pigeon Lake. There are no public small-craft facilities in the lake. A **slow-no wake speed** is enforced in the lake. A 650-foot white stack and a lighted 400-foot red and white banded stack at the Consumers Power Co. on the N side of Pigeon Lake are prominent.

From Port Sheldon, the shore trends S for 8.8 miles to the Holland Harbor entrance. Sand bluffs are close to shore, and deep water is within 0.5 mile of shore.

Charts 14906, 14932.–Holland Harbor, 63 miles S of Little Sable Point, is formed by **Lake Macatawa,** which is connected to Lake Michigan at its W end by an improved channel. The lake extends 5 miles E to its head at the mouth of **Macatawa River** and has a least width of 1,000 feet near its midlength. The width increases to over 1 mile in the vicinity of **Big Bay** and **Pine Creek Bay,** two large indentations in the N shore of the lake. The city of **Holland, Mich.,** fronts the E shore and much of the S shore of the lake. **Macatawa, Mich.,** is a small resort community on the SW side of the lake. The principal commodities handled in the port are coal, salt, cement, stone, and agricultural chemicals.

Holland Harbor North Breakwater Light (42°46.4'N., 86°12.9'W.), 45 feet above the water, is shown from a white skeleton tower on four cylinders with a square green daymark on the outer end of the breakwater; a fog signal is at the light.

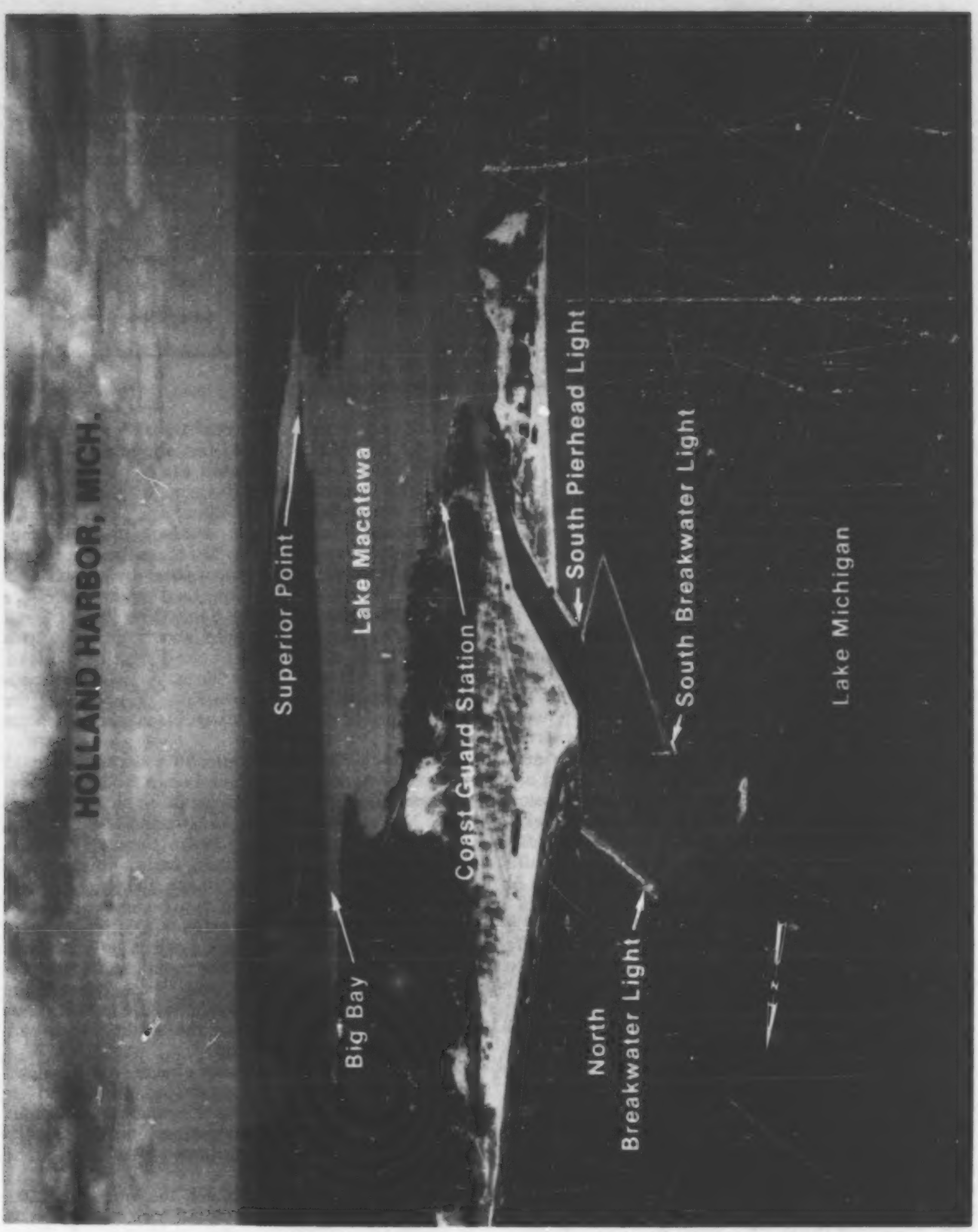
Channels.–The dredged entrance channel leads from deep water in Lake Michigan between converging breakwaters and through a revetted channel to Lake Macatawa. The outer and inner ends of the breakwaters are marked by lights. The channel, well marked by buoys, continues across the lake to a turning basin off Holland at the E end of the lake. From the NE side of the basin, the channel leads into the mouth of Macatawa River. Lights mark the outer edges of shoals that extend from shore into the lake.

In March 1985, the controlling depths were 15 feet in the approach channel, thence 12 feet (21 feet at midchannel) in the outer basin, thence 21 feet to Lake Macatawa, thence in 1982-June 1984, 19 feet at midchannel to the turning basin, thence 18 feet at midchannel through the turning basin with depths of 14 to 18 feet in the turning basin, thence 11 feet at midchannel to the head of the Federal project.

A dredged settling basin extends 700 feet upstream from the upper limit of the project in Macatawa River. In September 1980, the basin had depths of 7 to 11 feet in the lower half and 1½ to 12 feet in the upper half. Dredging disposal areas are in Macatawa River from 0.5 mile above the settling basin upstream to Windmill Island.

The currents in the entrance channel attain velocities up to 3 mph in either direction. Mooring to the breakwaters and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Outside the dredged channel, the W end of Lake Macatawa has central depths of 15 to 36 feet with much shoaler water extending from shore. In the E end of the lake, depths are 7 to 16 feet with shoals along the shore. Shoals with depths of 1 to 3 feet extend from shore on either side of the entrance to


HOLLAND HARBOR, MICH.
Superior Point
Lake Macatawa
Coast Guard Station
South Pierhead Light
South Breakwater Light
Lake Michigan
Big Bay
North Breakwater Light

Big Bay. The S limit of the E shoal is marked by a light. Buoys mark the channel into Big Bay between the shoals. A light marks the extent of a shoal off the S shore opposite Big Bay, and a light marks a shoal off Superior Point, on the N shore at the constriction of the lake.

Anchorage.–Pine Creek Bay affords good anchorage for small craft in mud bottom. A special anchorage is in the SW part of Lake Macatawa. (See **33 CFR 110.1 and 110.80a,** chapter 2, for limits and regulations.)

Holland Coast Guard Station is on the N side of Lake Macatawa near the harbor entrance.

Harbor regulations.–Federal regulations specify a **speed limit** of 8 mph (7 knots) in Lake Macatawa. (See **33 CFR 162.120,** chapter 2, for regulations.) State regulations specify a **slow-no wake speed** off Central Park near midpoint of the lake, off Kollen Park at the E end of the lake, and from the mouth of Macatawa River upstream to a point 1,500 feet above the River Avenue bridge.

Towage.–Tugs for Holland are available from Calumet (South Chicago) Harbor. (See Towage under Calumet (South Chicago) Harbor.)

Wharves.–Holland has several deep-draft facilities. The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.)

Verplanks Coal and Dock Co. Dock: (42°47'25"N., 86°07'15"W.); 200-foot W section along dolphins, 350-foot E section; 21 feet alongside; deck height, 4 feet; 6 acres open storage; receipt of limestone, salt, and slag; owned and operated by Verplanks Coal and Dock Co.

Penn-Dixie Industries, Inc. Wharf: immediately E of Verplanks Coal and Dock Co. Dock; 260-foot face; 18 feet alongside; deck height, 5 feet; storage silos for 6,600 tons of concrete; electrical connections; receipt of bulk cement; owned and operated by Cement Division, Penn-Dixie Industries, Inc.

Macatawa Bay Dock and Terminal Co. Wharf: immediately NE of Penn-Dixie Industries, Inc. Wharf; 850-foot face; 21 feet alongside; deck height, 6 feet; cranes to 50 tons; 30 acres open storage; water connections; receipt and shipment of scrap iron, receipt of pig iron; owned by Louis Padnos Iron and Metal Co. and operated by Macatawa Bay Dock and Terminal Co. and Louis Padnos Iron and Metal Co.

James DeYoung Municipal Power Plant Dock: adjacent NE of Macatawa Bay Dock and Terminal Co. Wharf; 850-foot face; 19 feet alongside; deck height, 6 to 7 feet; 3 acres open storage; receipt of coal; owned and operated by Holland Municipal Light and Power Co.

Brewers City Dock, Inc.: adjacent NE of James DeYoung Municipal Power Plant Dock; 759-foot face; 19 feet alongside; 5 acres open storage; receipt of limestone, agricultural lime, slag, salt, and potash; owned and operated by Brewers City Dock, Inc.

Small-craft facilities.–There are numerous marinas throughout Lake Macatawa. Gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, and launching ramps are available. Several lifts to 60 tons are available for hull, engine, and electronic repairs.

Storm warning signals are displayed from the marina on the NW side of Big Bay. (See chart.)

Chart 14906.–From Holland Harbor S for 7 miles to the mouth of the Kalamazoo River, the shore is low bluffs and occasional hills 100 to 250 feet high. Deep water is within 0.5 mile of shore. A sunken barge and crane is in 35 feet of water 0.6 mile offshore 3.8 miles S of Holland. Depth over the wreck is unknown.

Saugatuck Harbor, 70 miles S of Little Sable Point, is formed by a dredged entrance channel and the lower part of the **Kalamazoo River.** The dredged entrance is 0.75 mile N of the original natural river mouth. A radar dome on Mount Baldhead, about 1 mile S of the entrance, is prominent.

Channels.–In its lower 2 miles, the Kalamazoo River is from 200 to 500 feet wide. For the next 0.75 mile, the river widens to 2,000 feet and is known as **Kalamazoo Lake.** At the upper end of the lake, the river narrows again to 500 feet. The village of **Saugatuck, Mich.,** is on the N side of Kalamazoo Lake and the E side of the river below the lake. **Douglas, Mich.,** is a village on the S side of the lake.

The dredged entrance channel leads from deep water in Lake Michigan between parallel piers and revetments through the mouth of Kalamazoo River and thence upstream for about 2.1 miles to Saugatuck at the N end of Kalamazoo Lake. The outer ends of the piers are marked by lights, and the channel is marked by buoys. A fog signal is at the S pierhead light.

In August-September 1982, the controlling depth was 12 feet in the approach channel and through the piers and revetments, thence in September-October 1982, 9 feet at midchannel upstream to Saugatuck. The channel between the piers and revetments must be dredged frequently, as it tends to shoal after storms. Currents in the channel attain velocities up to 3 mph in either direction.

Mooring to the piers and revetments is prohibited.

An 8-foot channel was dredged through the upper part of Kalamazoo Lake in 1965, but in 1978, only a meandering channel remained.

From Saugatuck to Calkins, about 24 miles upstream, the river is from 100 to 150 feet wide and affords, at low water, a narrow and crooked channel for boats drawing not more than 2½ feet. The Allegan Dam at Calkins, does not have a lock, and boats must be portaged around it. The pool above the dam extends to Allegan and has a controlling depth of about 5 feet.

Caution.–Submerged pilings of the old piers at the former entrance of the river extend into the lake about 200 feet and are marked by a buoy. Navigation should not be attempted close to these structures.

Harbor regulations.–Federal regulations specify a **speed limit** of 8 mph (7 knots) in Saugatuck Harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) State regulations specify a **slow-no wake speed** from the river mouth upstream to Kalamazoo Lake.

Structures across Kalamazoo River to Allegan

**Miles above the mouth of the river*

***Clear width in feet proceeding upstream*

No.	*Location and Name*	*Kind .*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
1	Overhead cables	Power	2.78				25	
2	Saugatuck-Douglas bridge	Highway	2.80	58	58		17	Fixed.
3	I-196 bridge	Highway	3.35			72	18	Twin fixed.
4	Chesapeake & Ohio Ry. bridge	Railroad	10.80	41			13	Swing. Note 2.
5	New Richmond bridge	Highway	10.90	31	31		13	Swing. Note 2.
6	Allegan Dam bridge	Highway	26.10					Fixed. Note 1.
7	Huggins bridge	Highway	33.90	42	42	42	8	Fixed.
8	Chesapeake & Ohio Ry. bridge	Railroad	37.50	32	35		8	Swing. Note 2.
9	Allegan bridge	Highway	37.80			126	19	Fixed.

Note 1.–Bridge crosses the dam. Boats must portage around the dam.
Note 2.–See **33 CFR 117.1 through 117.49**, chapter 2, for drawbridge regulations.

Small-craft facilities.–There are several marinas at Saugatuck and at Douglas. Gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, marine supplies, and launching ramps are available. Hoists to 30 tons can handle 60-foot craft for hull and engine repairs.

Cable ferry.–A cable ferry crossing the Kalamazoo River 2 miles above the mouth is propelled by hauling a submerged chain which is worked around a hand capstan on the ferry. Vessels should avoid passing within 30 feet of the bow or stern of the ferry. Passage on its stern is preferred.

From Saugatuck Harbor for 19 miles S to South Haven, the shore is generally bluff with some steep clay banks. A boulder ledge with depths of 24 to 28 feet at the outer edge extends 1 mile offshore from 1.5 to 3.5 miles S of Saugatuck Harbor entrance. S of this area, deep water is within 0.6 mile of shore, but scattered boulders are throughout the stretch, and small craft should keep well clear of the shore.

South Haven, Mich., is a city and harbor at the mouth of the **Black River,** 88 miles S of Little Sable Point. The harbor is a base for recreational craft and local fish tugs. Two lighted radio masts 1 mile NE of the river mouth are prominent.

South Haven South Pierhead Light (42°24.1'N., 86°17.3'W.), 37 feet above the water, is shown from a red conical tower on the outer end of the S pier; a fog signal is at the light.

Channels.–The dredged entrance channel leads from deep water in Lake Michigan between parallel piers through the mouth of Black River upstream to a turning basin with its upper end about 0.7 mile above the mouth. The outer ends of the piers are marked by lights. In March 1985, the controlling depths were 14 feet in the approach channel, thence 12 feet between the piers to the turning basin with 7 to 12 feet in the basin. Mooring to the piers and revetments is prohibited.

Above the dredged channel, the Black River is navigable by small craft to the vicinity of the fixed highway bridge about 2.6 miles above the entrance.

Currents.–Currents in the river attain velocities up to 3 mph.

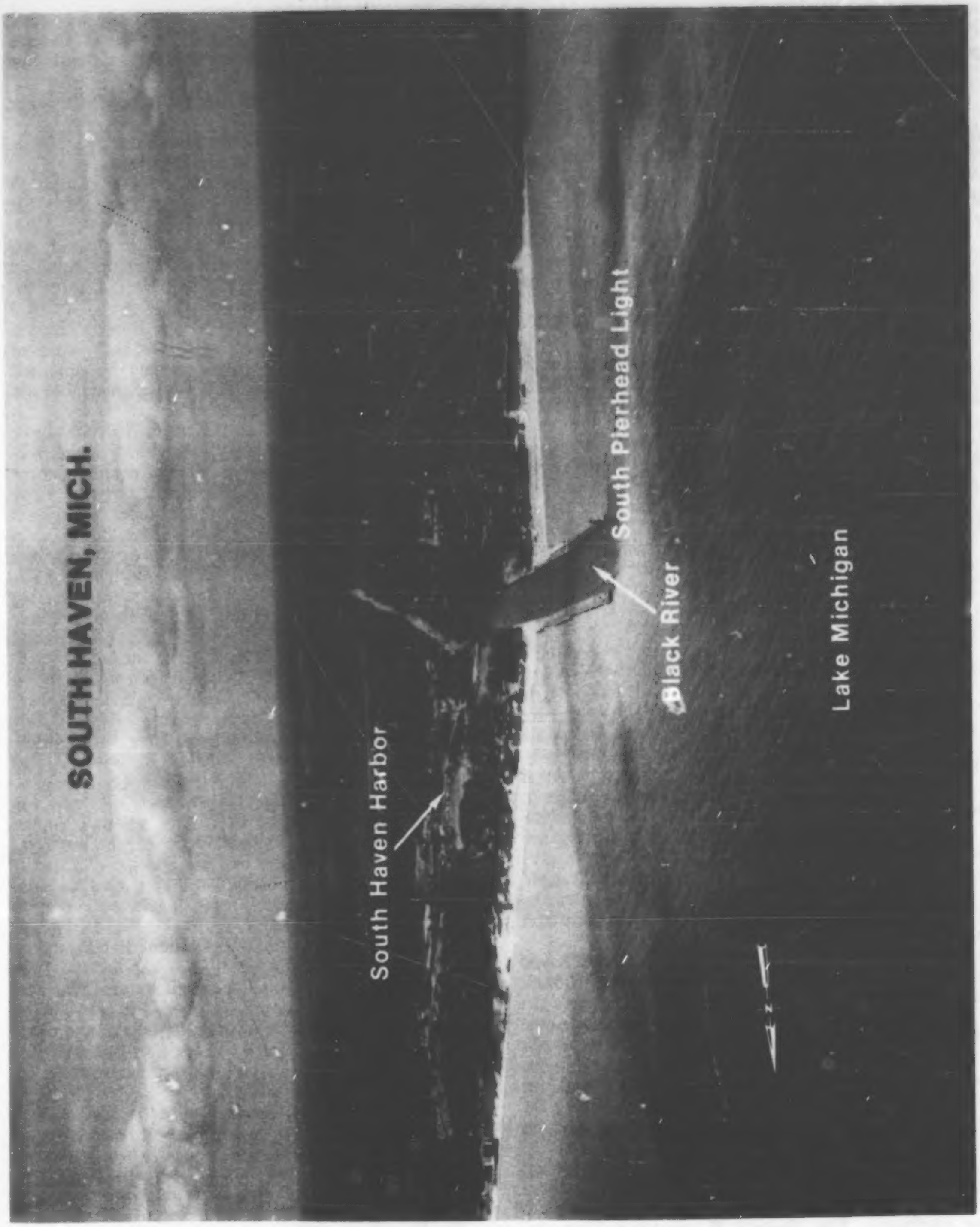
Bridges.–A bascule highway bridge with a clearance of 10 feet crosses Black River just above the head of the dredged channel. (See **117.1 through 117.49,** chapter 2, for drawbridge regulations.) An overhead cable with unknown clearance crosses the river 1.9 miles above the entrance. Fixed highway bridges about 2.2 and 2.6 miles above the entrance have clearances of 14 and 36 feet, respectively.

South Haven Coast Guard Station, operated on weekends during the boating season only, is on the S side of the entrance to Black River. A radio guard is usually maintained during daylight hours on holidays and weekends.

Harbor regulations.–Federal regulations specify a **speed limit** of 8 mph (7 knots) in South Haven harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) A **slow-no wake speed** is enforced in the harbor.

Small-craft facilities.–A public docking facility constructed by the city and the Michigan State Waterways Commission is on the N side of the river 0.5 mile above the mouth. Water, gasoline, diesel fuel, electricity, sewage pump-out facilities, and harbormaster services are available. A marina adjacent to the public dock provides gasoline, diesel fuel, sewage pump-out, and marine supplies. A 25-ton hoist is available for engine repairs. Hull and electronic repairs are available from local firms. Several marinas are above the Dyckman Avenue bridge.

Chart 14905.–From South Haven SSW for 22 miles to St. Joseph and Benton Harbor, the shore is skirted by low bluffs for the first 5 miles and higher bluffs in the remainder of the stretch. Deep water is



SOUTH HAVEN, MICH.

within 0.5 mile of shore. The Palisades Nuclear Power Plant 6 miles SSW of South Haven is prominent.

Charts 14905, 14930.–The **St. Joseph River** flows into Lake Michigan 22 miles SSW of South Haven and 107 miles S of Little Sable Point. The port cities of **St. Joseph, Mich.,** and **Benton Harbor, Mich.,** are on the W and E sides of the river, respectively. The principal commodities handled in the harbor are gravel and cement.

Prominent features.–A silver cupola about 0.8 mile ESE of St. Joseph North Pierhead Light and a lighted white tank 1,100 feet NNE of the cupola are prominent.

St. Joseph North Pierhead Light (42°06.9'N., 86°29.7'W.), 31 feet above the water, is shown from a white cylindrical tower on the outer end of the N pier; a fog signal is at the light. This light is sometimes obscured by city lights in the background.

Channels.–A dredged entrance channel leads from deep water in Lake Michigan between parallel piers through the mouth of St. Joseph River upstream for about 1 mile to the junction with **Paw Paw River.** The outer ends of the piers are marked by lights, and the N pier has an inner light. A turning basin is on the N side of the channel just below the junction. A canal extends from the turning basin through the mouth of Paw Paw River, thence continues E to Riverview Drive.

In May-August 1985, the controlling depths were 23 feet in the approach channel, thence 21 feet at midchannel to the Chesapeake and Ohio Railway bridge, except for shoaling to 17 feet near the pier center, thence 19 feet at midchannel to the canal with 16 to 18 feet in the turning basin decreasing to 10 feet in the N half, thence 7½ feet (17 feet in the S half) in the canal for about 650 feet, thence 13 feet to the head of the project. The canal and the area of the junction of St. Joseph and Paw Paw Rivers are subject to shoaling.

Currents in the river attain velocities up to 3 mph.

Navigation should not be attempted close to the piers due to stone riprap. Mooring to the piers and revetments is prohibited.

Above the dredged channel, the St. Joseph River turns S and flows between St. Joseph on the W bank and the city of Benton Harbor on the E bank. In 1980, this reach had depths of 6 to 20 feet in the best channel, generally near the E bank. Small islands near midstream in this reach are sometimes submerged during high water conditions. Depths of 2 to 3 feet can be carried for about 7 miles above St. Joseph. The river is obstructed by dams at Berrien Springs, about 22 miles above St. Joseph.

Morrison Channel cuts across the S turn in the St. Joseph River leaving the river about 1 mile above the pierheads and rejoining it about 2.5 miles above the pierheads. The channel is separated from the river channel by **Radio Island.** In 1971, Morrison Channel had a centerline controlling depth of 6 feet.

Above the dredged channel in the Paw Paw River, the crooked channel is navigable by small craft for about 2 miles to the Paw Paw Avenue bridge. In 1968, the centerline controlling depth was 1 foot.

St. Joseph Coast Guard Station is near the inner end of the N pier.

Towage.–Tugs are available from Sault Ste. Marie. (See Towage under Sault Ste. Marie.)

Harbor regulations.–A **speed limit** of 8 mph (7 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

Harbor regulations for the city of St. Joseph are enforced by the **harbormaster** and copies may be obtained from City Manager, City Hall, City of St. Joseph, St. Joseph, Mich. 49085.

Harbor regulations for the city of Benton Harbor are enforced by the **harbormaster,** who is the chief of police. Copies of the regulations may be obtained from the Chief of Police, 200 Wall Street, Benton Harbor, Mich. 49022.

Wharves.–St. Joseph and Benton Harbor have several deep-draft facilities along the dredged section of the St. Joseph River. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

Horan Redi-Mix Co. Dock: S side of river inside the mouth; 1,000-foot face; 22 feet alongside; bank height, 6 feet; 4.5 acres open storage; self-unloading vessels lay in channel and discharge by boom; receipt of sand, gravel, and rock salt; owned and operated by Horan Redi-Mix Co., Inc.

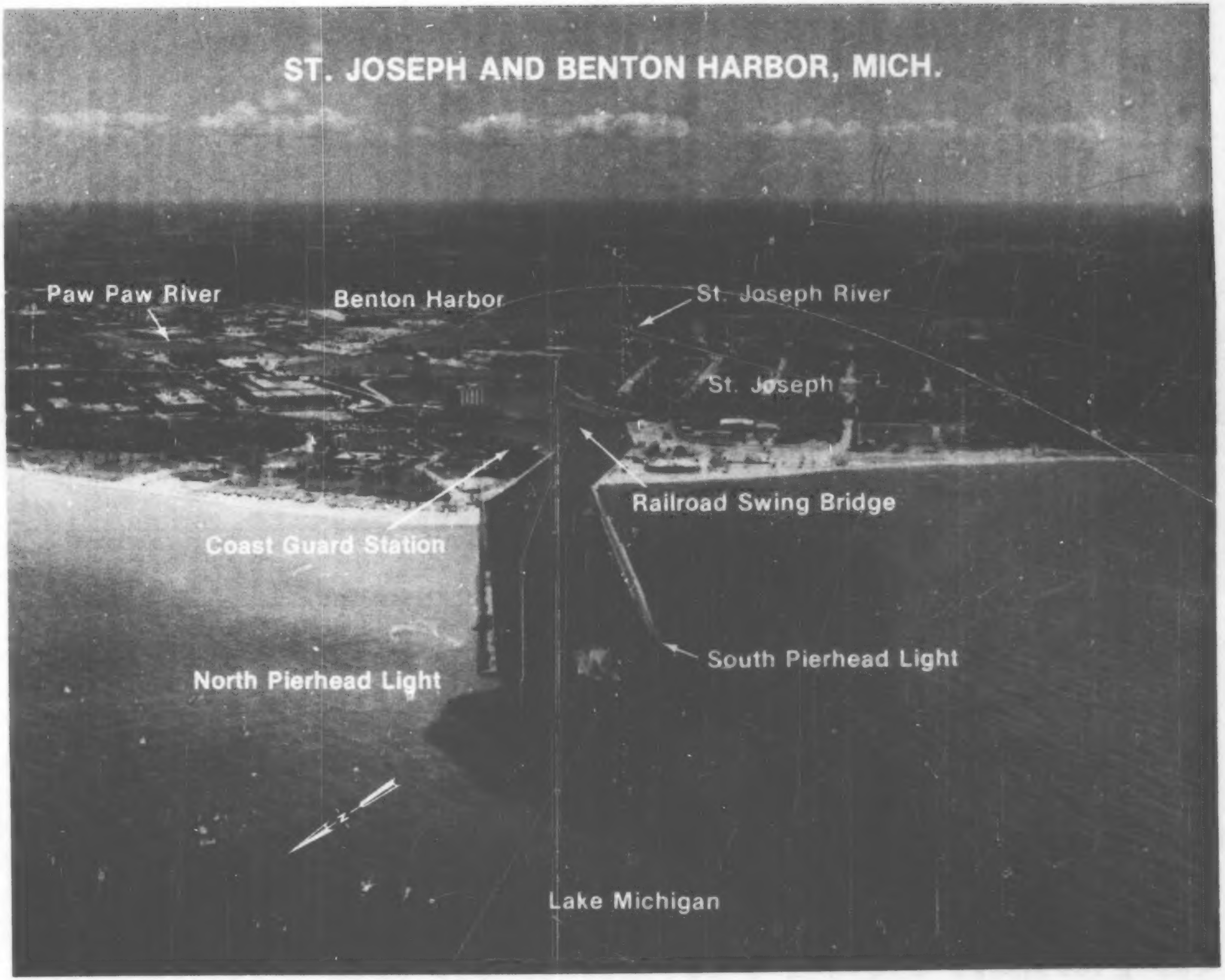
Huron Cement Dock: N side of river above Chesapeake and Ohio Railroad bridge; 560-foot face; 20 to 21 feet alongside; deck height, 7 feet; vessels unload through 10 inch pipelines; water connections; receipt of bulk cement; owned and operated by Huron Cement Division of National Gypsum Co.

Enterprise Oil and Gas Co. Dock: S side of river 900 feet above Interstate 94 bridge; about 600-foot face; 18 to 21 feet alongside; deck height, 6½ feet; tank storage for 311,000 barrels; receipt of fuel oil and diesel oil and occasional bunkering of vessels; owned by Ireland and Lester Co. and operated by Enterprise Oil and Gas Co.

Ireland and Lester Co. Dock: immediately above Enterprise Oil and Gas Co. Dock; about 400-foot face; 18 to 21 feet alongside; deck height, 6½ feet; 75,000 square feet covered storage; 9 acres open storage; receipt of sand, gravel, salt, stone, and fertilizer; owned by Clara Lester and operated by Ireland and Lester Co. and Horan Redi-Mix Co., Inc.

Consumers Asphalt and Concrete Co. Dock: (42°06'47"N., 86°28'16"W.); 1,000-foot face; 16 to 20 feet alongside; deck height, 4 feet; 7 acres open storage; receipt of sand, stone, salt, iron ore, and steel products; owned and operated by Consumers Asphalt and Concrete Co.

Small-craft facilities.–A public docking facility developed by the Michigan State Waterways Commission is just E of the Coast Guard Station. Gasoline, water, electricity, sewage pump-out facili-


ST. JOSEPH AND BENTON HARBOR, MICH.
Paw Paw River
Benton Harbor
St. Joseph River
St. Joseph
Railroad Swing Bridge
Coast Guard Station
North Pierhead Light
South Pierhead Light
N
Lake Michigan

Structures across St. Joseph River and Paw Paw River

**Miles above North Pierhead Light*
***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	St. Joseph River							
1	Chesapeake & Ohio Ry. bridge	Railroad	0.67	91	100		12	Swing. Note 1.
2	Blossomland (U.S. Route 33) Bridge	Highway	0.92			150	37	Bascule. Note 2.
3	Overhead cable		1.27				67	
4	Twin Cities Bicentennial Bridge (Main St./I-94 Bus.)	Highway	1.30			100	19	Bascule. Note 2.
5	Overhead cable	Power	1.52				76	
6	Penn Central (NYRR) bridge	Railroad	1.54					Swing. Bridge being removed.
7	Napier Ave. bridge	Highway	3.11			166	28	Fixed.
8	Overhead cables	Power	5.11				57	
9	Overhead cables	Power	5.70				54	
10	I–94 bridge	Highway	5.90	78	78		20	Fixed. 7 spans.
11	Overhead cables	Power	6.30				54	
12	Somerleyton bridge	Highway	6.60	124	94		18	Fixed. Navigable channel through right opening.
	Morrison Channel							
13	Overhead cables	Power	1.17				57	
14	Wayne St. (I–94) bridge	Highway	1.19			90	36	Fixed.
15	Overhead cable	Power	1.46				56	
16	Overhead cable	Power	1.76				57	
17	Overhead cable	Power	1.92				63	
	Paw Paw River							
18	ConRail bridge	Railroad	1.30			12	3	Fixed.
19	Overhead cable	Power	1.49				38	
20	Overhead cable		1.50					Data not available.
21	Chesapeake & Ohio Ry. bridge	Railroad	1.51			45	6	Fixed.
22	Overhead cables	Power	1.57				31	
23	Overhead cables	Telephone	2.02				27	
24	Klock Rd. bridge	Highway	2.05			53	9	Fixed.
25	North Shore Rd. bridge	Highway	2.57			39	9	Fixed.
26	Overhead cable		2.58					Data not available.
27	Paw Paw Ave. bridge	Highway	3.15			45	11	Fixed.
28	Overhead cable		3.15					Data not available.
29	Overhead cable		3.17					Data not available.
30	Chesapeake & Ohio Ry. bridge	Railroad	3.18				8	Fixed.
31	Overhead cable		3.19					Data not available.

Note 1.–See **33 CFR 117.1 through 117.49**, chapter 2, for drawbridge regulations.
Note 2.–See **33 CFR 117.1 through 117.59 and 117.651**, chapter 2, for drawbridge regulations.

ties, and harbormaster services are available. A 60-

ton hoist is available for hull, engine, and electronic repairs. Several privately operated marinas are in the harbor.

Supplies.–Vessels occasionally bunker at the Enterprise Oil and Gas Co. Dock 900 feet above the Interstate 94 bridge.

Chart 14905.–From the mouth of St. Joseph River, the shoreline trends SSW, thence SW, for about 35 miles to Michigan City. The shore in this stretch is a moderate bluff for the first 7 miles, thence a range of 200- to 400-foot hills for next 8 miles, and thence low bluffs for the next 20 miles to Michigan City. Deep water is within 0.6 mile of shore. The Donald C. Cook Nuclear Plant 10 miles SSW of St. Joseph is prominent.

New Buffalo, Mich., is a small-craft harbor about 25 miles SW of St. Joseph and about 10 miles NE of Michigan City.

Channels.–A dredged entrance channel leads E from deep water in Lake Michigan between converging breakwaters, thence SE to the mouth of the **Galien River** and upstream for about 0.2 mile. The outer ends of the breakwaters are marked by lights. In June-July 1985, the midchannel controlling depth was 5 feet.

The outer basin enclosed by the breakwaters has an area of about 6 acres; it is not adapted for anchorage of vessels, but reduces wave action in the lower section of the river. Mooring to the breakwaters is prohibited. Navigators are cautioned against navigating outside channel limits in the vicinity of structures protected by rock riprap along their sides.

Small-craft facilities.–A marina 2,600 feet SSW of the breakwater entrance provides transient berths, gasoline, water, electricity, sewage pump-out, marine supplies, and launching ramps. Hoists to 30 tons are available for complete marine repairs.

The **State boundary** between Michigan and Indiana is about 4.5 miles SW of New Buffalo entrance. **Central Standard Time** is observed on the lakeshore areas of Indiana and in the States of Illinois and Wisconsin.

Charts 14905, 14926.–**Michigan City, Ind.,** is a small-craft and fishing harbor at the mouth of **Trail Creek,** 35 miles SSW of St. Joseph and 38 miles SE of the mouth of the Chicago River.

Michigan City East Pierhead Light (41°43.7'N., 86°54.7'W.), 55 feet above the water, is shown from a white octagonal tower with a red roof and an attached building on the outer end of the E pier; a fog signal and radiobeacon are at the light.

Channels.–The entrance to Trail Creek is protected on the W by a detached breakwater. A dredged entrance channel leads S from deep water in Lake Michigan past the E end of the breakwater, turns SE, then S again between two piers at the mouth of the creek. The ends of the detached breakwater and the outer ends of the piers are marked by lights. Inside the creek, the channel leads upstream for about 1.3 miles to the E Street bridge. Turning basins are on the S side of the channel about 600 feet below the Franklin Street bridge and on the SW side about 400 feet above the Second Street bridge. A small-craft basin, on the NE side of the entrance channel, is entered through a cut in the E pier and is protected on the N side by a breakwater.

In July 1984, the controlling depths were 4 feet in the entrance channel to the West Pierhead Light, thence 14 feet at midchannel between the piers to the first turning basin, with 15 feet in the first turning basin, thence 3½ feet to the Sixth Street bridge, thence ½ foot to the E Street bridge. In 1971, the second turning basin had a controlling depth of 1 foot in the N part with the S part bare, and the small-craft basin had depths of 12 feet in the N part and 8 feet in the S part.

The piers and breakwaters are riprapped with large stones on all water sides. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Caution.–Strong NNW winds may cause large swells in the outer harbor and the entrance channel. Under heavy sea conditions, small craft may find it safer to enter the harbor S of the breakwater.

Michigan City Coast Guard Station is on the E side of the harbor entrance.

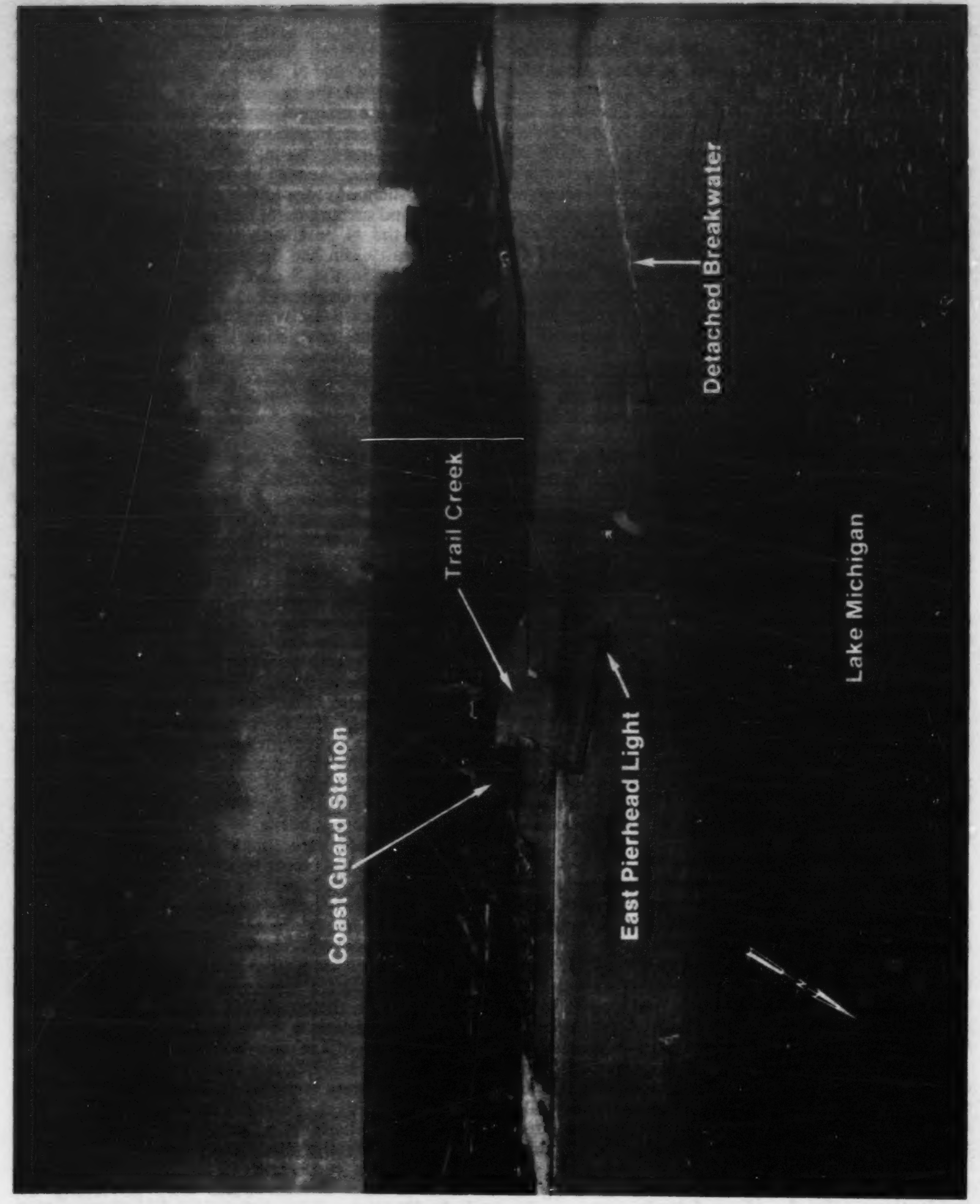
Harbor regulations.–A **speed limit** of 8 mph (7 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) Local regulations have been established by the city of Michigan City and are enforced by a **harbormaster.** Copies of regulations may be obtained from the harbormaster's office at Washington Park Marina, just E of the Coast Guard Station.

Small-craft facilities.–The municipal marina on the E side of the entrance channel provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and launching ramps. Marine supplies and hoists to 50 tons for hull, engine, and electronic repairs are available at several marinas in the lower mile of Trail Creek.

From Michigan City SW for about 23 miles to Gary, the shore is bordered by 100- to 200-foot hills, and deep water is within 0.5 mile. An obstruction, covered ½ foot, is close to shore 1.5 miles SW of the mouth of Trail Creek.

The S end of Lake Michigan is fully exposed to storms from the N, the fetch being about 300 miles. All severe storms from NW to NE create hazardous conditions, including powerful and dangerous seas, and strong currents running E to W or W to E, depending on the prevailing winds. An added unfavorable condition is found in the sandy nature and gentle slope of the lake bottom, depths of 70 feet occurring 8 to 10 miles from shore.

Indiana Dunes National Lakeshore is at the S end of Lake Michigan, generally between Michigan City and Gary, Indiana. The Lakeshore was authorized in 1966 and formally established within the National Park Service in 1972. Rules and regulations in 36 CFR 31 and Indiana State laws governing the Lakeshore area are enforced by National Park Service personnel on Federally owned lands. Copies of the Federal Regulations are generally available in major libraries.



READEX FICHE

Structures across Trail Creek

**Miles above West Pierhead Light*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
1	Franklin St. bridge	Highway	0.50			120	17	Bascule. Note 1.
2	Amtrak bridge	Railroad	0.85	41	44		7	Swing. Note 2.
3	Second St./U.S. 12 bridge	Highway	0.93			79	12	Bascule. Note 1.
4	Sixth St. bridge	Highway	1.19			69	10	Bascule. Note 1.
5	Overhead cable		1.33					Data not available.
6	Overhead cable		1.48					Data not available.
7	E St. bridge	Highway	1.49					Fixed. Head of navigation.

Note 1.–See 33 CFR 117.1 through 117.49, chapter 2, for drawbridge regulations.

Note 2.–See 33 CFR 117.1 through 117.59 and 117.401, chapter 2, for drawbridge regulations.

The National Park Service does not provide facilities for boaters at this time. Although the land acquisition program is nearly complete, not all sections of land to be included in the Park have actually been acquired to date. All mariners are advised that portions of the shore area remain as private property and occupancy in any manner may constitute trespassing on private property.

Certain portions of the shore have been designated as swimming beaches; these areas are closed to boats and are marked by buoys during the swimming season.

Burns Waterway Harbor, 14 miles SW of Michigan City, is an artificial harbor formed by a breakwater extending lakeward from the shore and turning E to enclose a harbor basin and two dredged arms which extend S from the basin into the shoreline. The harbor is entered SW from deep water in Lake Michigan on the S side of the breakwater. The NW corner and E end of the breakwater, and the S side of the harbor entrance, are marked by lights.

In August-September 1984, the controlling depths were 30 feet in the entrance channel, 26 feet in the harbor basin, and 24 feet in East Harbor Arm and in West Harbor Arm.

The Indiana Port Commission has constructed a bulkhead and fill in the area between East Harbor Arm and West Harbor Arm, and Bethlehem Steel Corporation has constructed a bulkhead and fill that extends about 1 mile E of the harbor entrance. These bulkheads are riprapped with stone. Mariners are advised to exercise caution when navigating in this area.

Dangers.–A submerged pipe, covered 1½ feet, has been reported about 125 feet N of the light marking the N side of the harbor entrance.

Towage.–Tugs to 1,640 hp are available at Burns Harbor from Great Lakes Towing Co. (800-321-3663) or from Calumet (South Chicago) Harbor. (See Towage under Calumet (South Chicago) Harbor.)

Harbor regulations.–Local regulations are established and enforced by the Indiana Port Commission. Copies of the regulations can be obtained from the Port Director, Indiana Port Commission, P. O. Box 189, Portage, Ind. 46368.

Radio facility.–The Indiana Port Commission operates a radio facility on VHF-FM channels 16 (156.80 MHz), 10 (156.50 MHz), 12 (156.60 MHz), and 68 (156.425 MHz), call sign, KVF 866. Communication with commercial and pleasure craft provides improved traffic control, and in conjunction with the State Police patrol boat, improved harbor security.

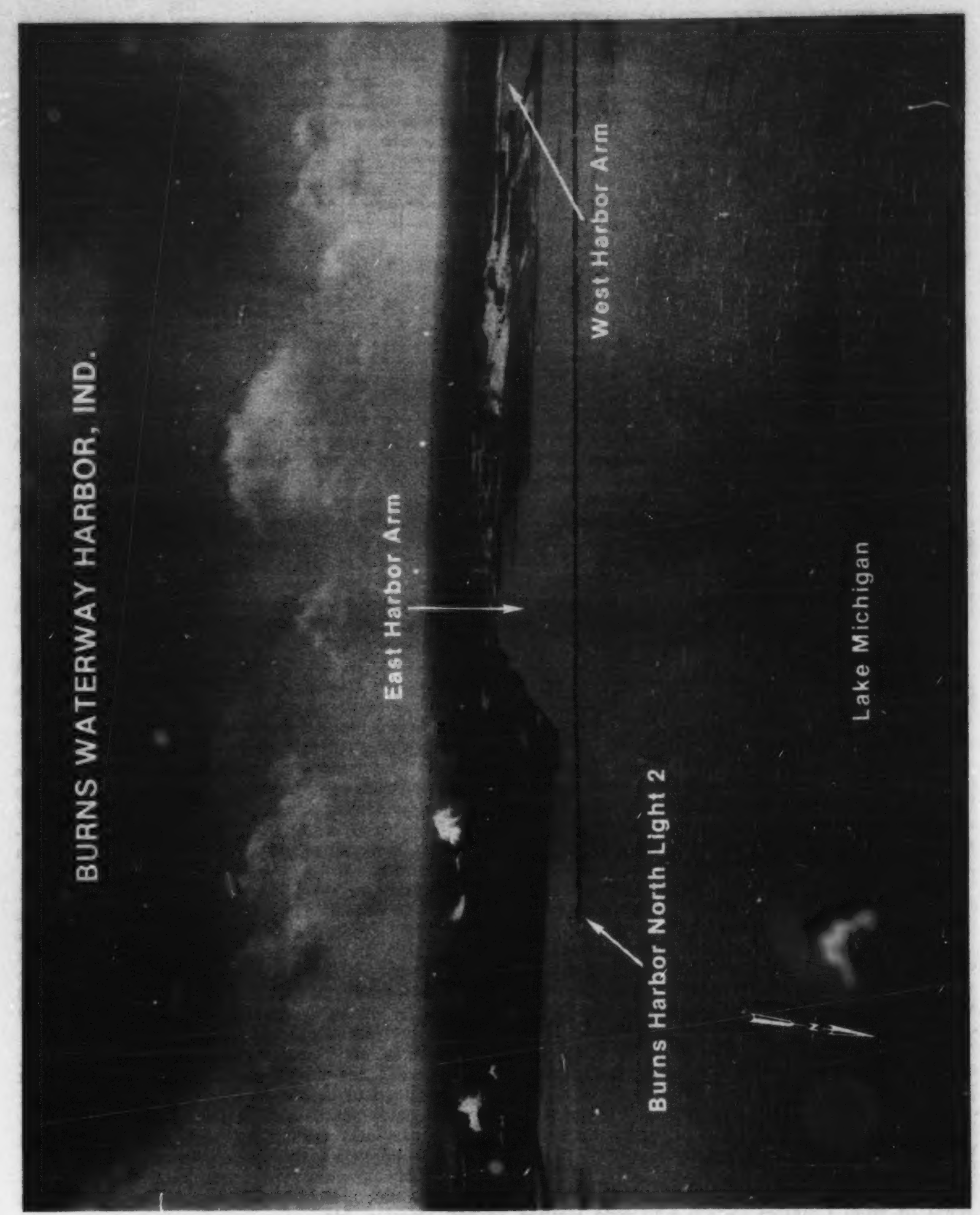
Wharves.–Burns Waterway Harbor has deep-draft facilities in East and West Harbor Arms. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the Indiana Port Commission or the operator.) Water and electrical shore-power connections are available at most berths in the harbor.

Facilities in West Harbor Arm:

Midwest Steel, Barge Dock: inner end of W side; 684-foot face; 27 feet alongside; deck height, 6 feet except 13 feet for center 300-foot section; open storage for 300,000 tons of steel products; cranes to 110 tons; receipt of coiled steel and shipment of steel products; owned and operated by Midwest Steel Division National Steel Corp.

Indiana Port Commission, Berth 5: S end of arm; 600 feet of berthing space along dolphins; 27 feet alongside; deck height, 13 feet, 6 acres open storage; rental equipment available; receipt of stone, coal, and miscellaneous bulk materials by self-unloading vessels; conveyor to potash storage at rear, rate, 2,000 tons per hour; owned by Indiana Port Commission and operated by Indiana Port Commission and Domtar, Inc.

Indiana Port Commission, Berths 1, 2, 3, and 4: inner end of E side; 1,800-foot face; 27 feet alongside; deck height, 13 feet; 118,000 square feet cov-


BURNS WATERWAY HARBOR, IND.
East Harbor Arm
West Harbor Arm
Burns Harbor North Light 2
Lake Michigan

ered storage; 10 acres open storage; cranes to 150 tons; receipt and shipment of steel and general and containerized cargo; owned by Indiana Port Commission and operated by Indiana Port Commission and Ceres Marine Terminals, Inc.

Facility in the harbor basin:

Indiana Port Commission, Cargill Dock: S side of basin between East and West Harbor Arms; 610 feet of berthing space with dolphins; 27 feet alongside; deck height, 13 feet; 4¼-million-bushel grain elevator; vessel loading spout, 90,000 bushels per hour; shipment of grain; owned by Indiana Port Commission and operated by Cargill, Inc.

Facilities in East Harbor Arm:

Indiana Port Commission, Berths 6 and 7: inner end of W side; 1,280-foot face; 27 feet alongside; deck height, 13 feet; 13 acres open storage; tank storage for 4¾ million gallons; cranes to 150 tons; receipt and shipment of blast furnace slag, steel, liquid fertilizer, liquid caustic soda, and miscellaneous bulk materials; owned by Indiana Port Commission and operated by various operators.

Indiana Port Commission, Berth 8: S end of arm; 360-foot face; 27 feet alongside; deck height, 13 feet; 2 acres open storage; tank storage for 2¾ million gallons; cranes to 150 tons; receipt and shipment of steel products, liquid fertilizer, liquid caustic soda, and miscellaneous bulk materials; owned by Indiana Port Commission and operated by various operators.

Bethlehem Steel Corp., Burns Harbor Plant Dock: E side of arm; 3,742-foot face; 27 feet alongside; deck height, 14 feet; 25 acres open storage; two 20-ton bucket unloaders, maximum rate 1,800 tons per hour for iron ore pellets; receipt of iron ore pellets and limestone, shipment of steel mill products; owned and operated by Bethlehem Steel Corp.

Portage-Burns Waterway, 2 miles SW of the entrance to Burns Waterway Harbor, is a drainage canal about 1.5 miles long that extends S from the lake to Little Calumet River. It is navigable only by shallow-draft vessels. In 1971, the controlling depths were 5 feet in the approach, thence 3 feet from the entrance S for 1.2 miles. In May 1982, shoaling to 1 foot was reported in the entrance. The entrance to the canal is marked by private lights. A jetty 600 feet NE of the entrance is marked at the outer and inner ends by private lights. A marina on the W side of Portage-Burns Waterway about 0.8 mile above the entrance provides transient berths, gasoline, water, electricity, sewage pump-out, limited marine supplies, a launching ramp, and a 12-ton hoist.

Charts 14905, 14926, 14927.–Gary Harbor is a private harbor at the S extremity of Lake Michigan, about 22 miles SW of Michigan City and 14 miles SE of Calumet Harbor entrance. The entirely artificial harbor was developed and is owned by United States Steel Corp.

Channels.–The harbor comprises a channel extending S into the shoreline for about 1 mile between parallel piers to a turning basin. The entrance to the channel is protected by a breakwater extending generally NE from the W side of the entrance. The outer end of the breakwater and outer ends of the piers are marked by private lights. A fog signal is at the breakwater light. A bulkhead, enclosing a fill area along the shore, extends 1.8 miles E from the E side of the channel entrance and is marked at its E end by a light. An unmarked shoal extends about 400 yards NNE of the E entrance point.

Depths in the channel are maintained to at least 27 feet. Just inside the entrance, the channel is crossed by an overhead pipeline with a clearance of 125 feet and an overhead power cable with a clearance of 132 feet. About 0.65 mile above the entrance, the channel is crossed by an overhead conveyor with a clearance of 125 feet.

Towage.–Tugs are available from Calumet (South Chicago) Harbor. (See Towage under Calumet (South Chicago) Harbor.)

Wharves.–United States Steel Corp. operates deep-draft berths along both sides of the channel at Gary Harbor. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for these berths are reported depths. (For information on latest depths, contact the operator.)

West Dock: 5,280 feet of berthing space; 27 to 31 feet alongside; deck height, 11 feet; open storage for over 4 million tons of material; four hulett-type unloaders, 600 tons per hour each; receipt of iron ore, iron ore pellets, and limestone.

East Dock: 4,352 feet of berthing space; 27 to 29 feet alongside; deck height, 11 feet; open storage for 500,000 tons of material; cranes to 100 tons; receipt of limestone and dolomite, shipment of scrap metal and steel mill products.

Charts 14905, 14926, 14927, 14929.–From Gary Harbor to Wilmette, Ill., 36 miles NW, the SW shore of Lake Michigan is developed with extensive private commercial facilities, public utilities, marinas, and yacht clubs.

Buffington Harbor, a private harbor owned by the Universal Atlas Cement Division of the U.S. Steel Corp., is about 3 miles SE of Indiana Harbor and 4.5 miles NW of Gary Harbor. The harbor is built in the lake in front of the company's plant on bulkheaded and filled land that extends 2,400 to 2,900 feet beyond the natural shoreline.

Channels.–The harbor basin is protected on the W and N sides by a breakwater that extends from the shore W of the wharf which forms the E side of the basin. The outer end of the breakwater and the wharf are marked by private lights; a private fog signal is at the wharf light. A private **236½°** lighted range at the head of the basin marks the harbor approach. The basin has been dredged to 26 feet, but the depths gradually decrease to about 12 feet along the breakwater on the W side of the harbor.

From the NE end of the wharf, the entire shoreline for about 4.5 miles SE to Gary Harbor has been bulkheaded and filled.

The wharf on the E side of the basin provides 2,128 feet of berthing space with dolphins and a deck height of 8 feet. The reported depth alongside is 20 to 28 feet. There is open storage for about 1¼ million tons of material, and a retractable conveyor can load vessels with slag at 1,000 tons per hour. Limestone, bauxite, cement clinker, and bulk materials are received, and slag and miscellaneous bulk materials are shipped.

Towage.–Tugs are available from Calumet (South Chicago) Harbor. (See Towage under Calumet (South Chicago.)

Indiana Shoals, an extensive bank in the approaches to Indiana Harbor and Calumet Harbor, extends about 5 miles NE from the outer end of the fill area which forms the E side of the entrance to Indiana Harbor. The bank has several ridges with depths of 15 to 18 feet near its inner end, and has depths of 22 to 30 feet near its outer end. A lighted gong buoy marks the E side of the bank.

A wreck, covered 21 feet, is N of Indiana Shoals, 6.2 miles NE of the entrance to Indiana Harbor. The wreck is marked on the W side by a buoy. A research tower, marked by a private light 30 feet above the water, is about 700 feet NW of the wreck in 40°46'11"N., 87°23'45"W. The tower is supported by cables that may extend to 50 feet from its base. Mariners are advised to exercise caution while navigating in the vicinity.

Indiana Harbor, an artificial harbor at **East Chicago, Ind.,** is about 3 miles NW of Buffington Harbor and 6 miles SE of Calumet Harbor. The harbor has an outer basin which is entered from N and is enclosed by bulkheaded fill areas that extend 2.6 miles NE from the natural shoreline. The outer corners of the bulkheads are marked by private lights. The fill area S and E of the basin is occupied by Inland Steel Co., and the area W of the entrance channel and basin is occupied by Jones and Laughlin Steel Corp. The inner harbor is formed by a dredged canal that extends SW from the outer basin into the shoreline.

Indiana Harbor East Breakwater Light (41°40.9'N., 87°26.5'W.), 78 feet above the water, is shown from a white square tower on a concrete base on the E side of the entrance channel; a fog signal and a radiobeacon are at the light.

Channels.–The dredged entrance channel leads SSE from deep water in Lake Michigan between breakwaters to an outer harbor basin. The entrance channel is marked by a buoy and by lights on the outer and inner ends of the breakwaters. From the outer harbor basin, a canal entrance channel extends SW to **Indiana Harbor Canal,** which continues SW for 1.4 miles to a turning basin at **The Forks.** The entrance to the canal is marked by lights. The channel width in the canal is restricted by the clear width of the bridge span openings of 61.7 feet. From The Forks, **Calumet River Branch** extends S for about 0.4 mile to just below Columbus Drive bridge, and **Lake George Branch** extends W for about 0.6 mile.

In September 1984, the controlling depths were 22 feet at midchannel in the entrance channel, thence 20 to 28 feet in the outer harbor basin with lesser depths along the edges, thence 19 feet in the entrance channel to Indiana Harbor Canal, thence 13 feet at midchannel through the canal, thence 16 to 22 feet in the turning basin at The Forks except for shoaling along the SW and E edges, thence in the Calumet River Branch, depths decreasing from 21 feet at the N end to 5½ feet at the S end, and thence, in Lake George Branch, 17 feet at midchannel to the W end.

Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Caution.–A floating oil boom is permanently moored across Lake George Branch just above the dredged channel.

Towage.–Tugs for Indiana Harbor are available from Calumet (South Chicago Harbor. (See Towage under Calumet (South Chicago) Harbor.)

Wharves.–Indiana Harbor has numerous deep-draft facilities in the outer basin, along both sides of Indiana Harbor Canal, and in the branch channels. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) Some of the facilities described have water and electrical shore-power connections, and most have highway and rail connections. Many of the facilities are used for mooring vessels during the closed navigation season.

Facilities on the N side of Indiana Harbor Canal:

Jones and Laughlin Steel Corp., Indiana Harbor Works, Barge Dock: outer end of canal entrance channel adjacent to outer basin; 1,009-foot face; 18 to 24 feet alongside; deck height, 7½ feet; open storage for 36,000 tons of limestone and 597,000 tons of iron ore pellets; 25-ton mobile hoist; receipt of limestone; owned and operated by Jones and Laughlin Steel Corp.

Jones and Laughlin Steel Corp., Indiana Harbor Works, Ore Dock: adjacent W of Barge Dock; 2,275-foot face; 20 to 25 feet alongside; deck height, 7½ feet; trough and bin storage for over 1½ million tons of material; two bucket unloaders, 600-ton-per-hour capacity each; receipt of iron ore pellets, iron ore, and limestone; owned and operated by Jones and Laughlin Steel Corp.

United States Gypsum Co. Dock: between Elgin, Joliet, and Eastern Railway bridge and The Forks; 991-foot face; 15 to 19 feet alongside; deck height, 6 feet; self-unloading vessels moor in channel and discharge by boom to 100,000-ton capacity storage shed; receipt of gypsum rock; owned and operated by United States Gypsum Co.

Facilities in Lake George Branch:

Amoco Oil Co. Dock: N side immediately W of The Forks turning basin; 1,430-foot face; 21 to 29 feet alongside; deck height, 6 feet; tank storage for over 2 million barrels; receipt and shipment of petroleum products; owned and operated by Amoco Oil Co.

Structures across Indiana Harbor Canal

**Miles above Indiana Harbor Outer Basin*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	Main Channel							
1	Elgin, Joliet & Eastern Ry. bridge	Railroad	0.68			61	8	Bascule. Note 1.
2	Overhead cables		0.68				199	
3	Baltimore & Ohio RR bridge	Railroad	0.70			66	8	Bascule. Note 1.
4	ConRail bridge	Railroad	0.71			65	7	Bascule. Note 1.
5	ConRail bridge	Railroad	0.72			65	7	Bascule. Note 1.
6	Overhead pipeline		0.73			65	125	
7	Indiana Harbor Belt RR bridge	Railroad	0.73			65	7	Bascule. In permanent open position.
8	ConRail bridge	Railroad	0.98			65	6	Bascule. Note 1.
9	Overhead cable	Power	1.20				110	
10	Dickey Road bridge	Highway	1.21			118	18	Bascule. Note 1.
11	Overhead cable		1.23				145	
12	Cline Avenue (S912) bridge	Highway	1.61			230	100	Fixed.
13	Overhead cables	Power	1.86				140	
14	Canal St. bridge	Highway	1.88			65		Bridge leaves removed. Note 2.
15	Elgin, Joliet & Eastern Ry. bridge	Railroad	1.89			65	5	Bascule. Note 1.
	The Forks		2.10					
	Calumet River Branch							
16	Overhead cable		2.58					Data not available.
17	Columbus Dr. bridge	Highway	2.60			41	8	Temporary trestle.
18	South Chicago & Southern and Baltimore & Ohio Chicago Terminal RR bridge	Railroad	3.21			34	3	Fixed.
19	Chicago Ave. bridge	Highway	3.29			50	9	Fixed.
21	Indiana Harbor Belt RR bridge	Railroad	3.99			36	4	Fixed.
22	Elgin, Joliet & Eastern Ry. bridge	Railroad	4.00			52	3	Fixed.
	Lake George Branch							
23	Overhead cable		2.58					Data not available.
24	Indianapolis Blvd. bridge	Highway	2.59			64	12	Bascule. Note 1.
25	Overhead cable		2.60				111	
26	Overhead cable		3.00					Data not available.
27	Baltimore & Ohio Chicago Terminal RR bridge	Railroad	3.01			65	5	Fixed.
28	Overhead cable	Power	3.07				26	

Note 1.–See 33 CFR 117.1 through 117.49, chapter 2, for drawbridge regulations.

Note 2.–In 1984, it was reported, deteriorated abutments have reduced the horizontal clearance to about 60 feet.

Associated Box Corp. Dock: immediately W of

Amoco Oil Co. Dock; 377-foot face; 17 to 25 feet alongside; deck height, 6 feet; tank storage for 890,000 barrels; receipt and shipment of petroleum products; owned by Associated Box Corp. and operated by American Recovery Co., Inc., Clark Oil and Refining Corp., and Bigane Vessel Fueling Co.

Energy Cooperative Inc., East Chicago Refinery Dock: N side above Indianapolis Boulevard bridge; 1,347-foot face; 23 to 27 feet alongside; deck height, 6 feet; storage for about 2½ million barrels; shipment of petroleum products; owned and operated by Energy Cooperative Inc.

Cy's Trucking and Transfer Co., Inc. Dock: S side immediately W of The Forks turning basin; 600-foot face; 23 feet alongside; deck height, 9 feet; 18,000 square feet covered storage; cranes to 80 tons; receipt of steel and bulk products; owned and operated by Cy's Trucking and Transfer Co.

Facilities in Calumet River Branch:

Cities Service Co. Dock: W side of the branch 1,000 feet below Columbus Drive bridge; 600-foot face; 15 to 19 feet alongside; deck height, 9 feet; tank storage for 4 million barrels; occasional receipt and shipment of petroleum products; owned and operated by Cities Service Co.

Mobil Oil Corp., Calumet River Branch South Dock: W side of the branch below Columbus Drive bridge; 640-foot face; 11 to 21 feet alongside; deck height, 9 feet; tank storage for 1 million barrels; shipment of petroleum products; bunkering vessels; owned and operated by Mobil Oil Corp.

Phillips Pipe Line Co., East Chicago Terminal Dock: E side of the branch 700 feet below Columbus Drive bridge; 600-foot face; 7 to 19 feet alongside; deck height, 8 feet; tank storage for 3¼ million barrels; shipment and occasional receipt of petroleum products; owned and operated by Phillips Pipe Line Co.

Northern Indiana Dock Co. Wharf: E side of the branch 1,500 feet below Columbus Drive bridge; 479-foot face; 14 to 19 feet alongside; deck height, 7 feet; cranes to 60 tons; receipt and shipment of scrap metal; owned and operated by Northern Indiana Dock Co., Inc.

Facilities on the S side of Indiana Harbor Canal:

Inland Steel Co., Plant No. 3 Dock: between ConRail bridge and Dickey Place bridge; 990-foot face; 13 to 20 feet alongside; deck height, 8 feet; storage bins and troughs for over 1 million tons of material; two bucket unloaders, combined rate 800 tons per hour; receipt of iron ore pellets and limestone; owned and operated by Inland Steel Co.

Inland Steel Co., Plant No. 2 Dock: outer end of canal entrance channel adjacent to outer basin; 3,465-foot face; 20 to 28 feet alongside; deck height, 6 to 8 feet; storage bins for over 2 million tons of material; five unloading cranes with buckets, unloading rate 1,000 tons per hour each; receipt of iron ore, iron ore pellets, and limestone; bunkering vessels; owned and operated by Inland Steel Co.

Facilities on the E side of the outer basin:

Inland Steel Co., No. 4 Dock: southernmost dock on E side of outer basin; 1,075 feet of berthing space along dolphins; 14 to 22 feet alongside; deck height, 3 to 5 feet; open storage for 240,000 tons of limestone; receipt of limestone; owned and operated by Inland Steel Co.

Inland Steel Co., No. 6 Dock: immediately N of Inland Steel Co., No. 4 Dock; 3,370-foot face; 28 feet alongside; deck height, 6½ feet; open storage for over 2 million tons of material; cranes to 150 tons; receipt of fluorspar, limestone, iron ore pellets, coke, and plant machinery; shipment of steel mill products and ammonium sulphate; owned and operated by Inland Steel Co.

Small-craft facility.–A marina on the lakeshore just S of the fill area that forms the E side of Indiana Harbor provides gasoline and a 5-ton hoist.

Commonwealth Edison Co. of Indiana powerplant is on a bulkheaded fill area 4 miles NW of the entrance to Indiana Harbor.

The **State boundary** between Indiana and Illinois is just W of the powerplant about 4 miles NW of Indiana Harbor entrance.

Calumet (South Chicago) Harbor is 14 miles NW of Gary Harbor and about 333 miles by water from the Straits of Mackinac. The harbor is in the S part of the city of **Chicago, Ill.**, and comprises an outer harbor protected by breakwaters and the **Calumet River.** The city of Chicago, including Calumet and Chicago Harbors, is one of the largest inland ports in the world. Deep-draft traffic enters the harbors from Lake Michigan, and barge traffic enters from the Mississippi River via the Illinois Waterway. The principal commerce in the port includes receipt of iron ore, coal, limestone, petroleum products, and general and containerized cargo, and shipment of grain, steel, machinery, and agricultural products.

Prominent features.–Stacks at the Commonwealth Edison Co. of Indiana powerplant 1.8 miles S of the mouth of Calumet River and at the U.S. Steel Corp. plant on the N side of the river mouth are prominent. A spire in Whiting, Ind., 3.9 miles S of the river mouth, is also prominent.

Calumet Harbor Light (41°44.3'N., 87°30.5'W.), 51 feet above the water, is shown from a white cylindrical tower with an attached building on the N side of the breakwater gap 1.2 miles E of the Calumet River mouth.

Calumet Harbor Breakwater South End Light (41°43.5'N., 87°29.6'W.), 50 feet above the water, is shown from a white square skeleton tower, lower half open, on the SE end of the Calumet Harbor breakwaters; a fog signal and a radiobeacon are at the light. This light is sometimes difficult to distinguish from vehicle lights on shore.

Channels.–A breakwater and breakwater extension extend E from the shore about 0.5 mile N of the mouth of Calumet River and turn SE to protect the river entrance and provide an outer harbor of refuge 1 square mile in extent. The outer end of the breakwater and each end of the extension are marked by lights. A dredged approach channel from Lake Michigan leads SW around the S end of the breakwater extension to the outer harbor. The approach channel is marked by lighted buoys, and the SW limit of the outer harbor basin is marked by buoys. From the W end of the outer harbor, a channel leads between piers through the mouth of the river upstream for about 0.6 mile to the Elgin, Joliet & Eastern Railway bridge. The outer ends of the piers are marked by lights.

In 1964-1973, the midchannel controlling depths were 27 feet in the approach channel, thence in September 1981, 25 feet in the outer harbor decreasing to 23 feet at the mouth of the river, thence in March 1982, 27 feet at midchannel in the river channel upstream to the Elgin, Joliet & Eastern Railway bridge.

North Slip opens into the outer harbor 0.5 mile N of the mouth of Calumet River. The approach to the slip is marked by a private 288½° lighted range and by a private light on the S side of the entrance. Overhead power cables with a clearance of 109 feet cross the mouth of the slip. **South Slip** is entered 0.4 mile above the river mouth. A system of submerged bubbler pipes crosses the mouth of each slip; vessels are cautioned not to drop or drag anchor in the vicinity.

The undredged portion of the outer harbor between the river mouth and the entrance to North Slip has depths of about 2 to 20 feet extending about 0.25 mile from shore. In April 1985, a rock, covered 1 foot, was reported about 470 feet ENE of Calumet Pierhead Light in about 41°44'04"N., 87°31'40"W.

A diked disposal area is on the W side of the outer harbor S of the entrance to Calumet River. The NE corner of the area is marked by a private light.

In the Calumet River, a dredged channel leads from the Elgin, Joliet & Eastern Railway bridge upstream for about 5.5 miles to Turning Basin No. 5. Turning Basin Nos. 1 and 3 are on the E side of the channel 0.9 and 4.5 miles above the mouth of the river, respectively.

In March-April 1982, the controlling depth was 24 feet at midchannel from the Elgin, Joliet & Eastern Railway bridge upstream to Turning Basin No. 5, thence 22 feet in Turning Basin No. 1, 24 feet in Turning Basin No. 3 except for shoaling along the edges, and 25 feet in Turning Basin No. 5 except for shoaling along the edges. Several large pieces of concrete have fallen into the water along the S edge of Turning Basin No. 3 and pose a potential danger to navigation.

From Turning Basin No. 5, the Calumet River leads S for 0.7 mile to the Thomas J. O'Brien Lock at the entrance to the Illinois Waterway. About 0.5 mile above the lock, the Calumet River branches into the Little Calumet River and the Grand Calumet River. (The lock and the Little Calumet River are described under Illinois Waterway, this chapter.)

Grand Calumet River formerly emptied into Lake Michigan at Gary, Ind., but its mouth is now closed, and it is a dead river 18 miles long with a very small drainage area. There is no current in the river except what is caused by floods and freshets. Except for several shoals, the river is navigable by shallow-draft launches that can pass under the bridges.

The limiting clearances under the bridges are 8 feet for about 3.5 miles, thence 5 feet for about 11 miles. The swing and bascule bridges across the river are inoperable. Several bridges have been replaced by earthfill causeways with only culverts to carry the flow. About 6 miles above the junction with Calumet River, a non-navigable branch connects with Calumet River Branch of Indiana Harbor Canal.

Lake Calumet, NW of Turning Basin No. 5, is about 1.2 miles long N and S and about 1 mile wide. The lake is at practically the same level as Lake Michigan and has an average depth of about 2 feet. A temporary earth dike has been constructed at the S end of Lake Calumet by the Chicago Regional Port District.

In March 1982, the dredged channel, which leads NW from Turning Basin No. 5 in Calumet River to Lake Calumet, had a controlling depth of 25 feet.

Anchorages.–The outer harbor basin provides good anchorage in mud and sand bottom. Due to the large number of vessels using this important shelter during severe weather, it is important that anchorage space within the harbor be utilized in an orderly manner. Accordingly, it is requested that vessels do not anchor closer than 1,000 feet to any part of the breakwaters unless no other anchorage space is available, and that, if it is necessary to anchor closer than 1,000 feet to the breakwaters, vessels anchor in such manner as not to unreasonably obstruct the free passage and progress of other vessels through the harbor.

In good weather, vessels may also find anchorage within 3 miles E to S of Breakwater South End Light. However, charted wrecks and traffic lanes to Indiana and Calumet Harbors restrict the usable area somewhat.

Dangers.–Several shoals are in the approach to Calumet Harbor. A rocky bank with a least depth of 21 feet is 1 mile NE of Calumet Harbor Breakwater South End Light. A lighted buoy at the SE end of the ledge marks the N side of the dredged approach channel. Two 23-foot spots and a 27-foot spot, 2 to 2.5 miles NE of Calumet Harbor Light, are marked on the E side by a lighted bell buoy. **Calumet Bar**, an extensive area with depths of 21 to 24 feet, is on the NE side of the breakwater and extension.

The gap between the breakwater and the extension provides an entrance to the harbor for small craft. However, small craft should exercise caution when using the entrance gap. Dangerous currents frequently exist in the entrance gap, especially during storms. Hazardous currents are also caused by surges resulting from a sudden rise or fall in the lake level. This frequently occurs during periods of calm. The Lake Carriers' Association recommends that cargo vessels use the S entrance exclusively.

In general, the dredged areas of the outer harbor do not extend closer than 300 feet from the breakwaters. Mariners should exercise caution and not attempt to navigate in the undredged areas adjoining the breakwaters. Navigators are cautioned against navigating outside channel limits in the vicinity of structures protected by rock riprap along their sides.

In March 1984, a 150-foot break was reported in the breakwater extension about 150 yards NW of Calumet Harbor Breakwater South End Light; caution is advised.

Fluctuations of water level.–In addition to the normal fluctuations which affect Lake Michigan somewhat uniformly, local oscillations of up to 2 feet above or below Low Water Datum are reported to have durations of a few minutes to a few hours. These changes are produced by winds and barometric pressure changes which accompany storms. Strong sustained winds may also affect the water levels for as long as a day.

Caution.–Since the opening of Calumet Sag Channel, the Calumet River has a gentle flow away from Lake Michigan except at times of heavy rains, floods, or sudden fluctuations of water levels.

Towage.–Tugs to 1,640 and 1,250 hp are available in the Calumet (South Chicago) Harbor area from Great Lakes Towing Co. and North American Towing Co., respectively. Arrangements for the former companies' tugs are made through the dispatcher in Cleveland (800-321-3663) or via VHF-FM remote antenna. The North American Towing Co. dispatcher is in Chicago (312-734-6311) and has VHF-FM capability to a 25- mile radius.

Chicago is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Calumet Harbor Coast Guard Station is on the lakefront in the S part of Calumet Park, about 1.1 miles S of Calumet River entrance.

Harbor regulations.–Local harbor regulations for Calumet Harbor have been established by the Chicago Regional Port District and are enforced by various local law enforcement agencies, who can be reached through the Port District. Copies of the regulations can be obtained from the Chicago Regional Port District, 12800 Butler Drive, Lake Calumet Harbor, Chicago, Ill. 60633. A **speed limit** of 5 mph (4.3 knots) is enforced within the harbor.

Wharves.–Calumet Harbor has numerous facilities in the outer harbor, the Calumet River and in Lake Calumet. Only the deep-draft facilities are described. (For complete information on the port facilities, refer to Port Series No. 46, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) Most of the facilities described have highway and rail connections, and many have water and electrical shore-power connections. Many of the piers, wharves, and docks are used for mooring vessels during the closed navigation season.

Facilities in North Slip:

United States Steel Corp., South Works, North Dock: N side of the slip; 2,432-foot face; 26 to 29 feet alongside; deck height, 10 feet; shipment of slag; owned by United States Steel Corp. and operated by United States Steel Corp. and International Mill Services, Inc.

Facilities in South Slip, about 0.5 mile above the river mouth:

United States Steel Corp., South Works, South Slip: E side of the slip; 1,223-foot face; 18 to 30 feet alongside; deck height, 9 feet; 9 acres open storage; 30 ton gantry crane; shipment of billets, slabs, ingots and steel products; occasional receipt of machinery, equipment, and supplies; owned and operated by United States Steel Corp.

Corps of Engineers, Chicago District Calumet Harbor Suboffice Dock: W side of the slip; 79 feet of berthing space; 11 to 13 feet alongside; deck height, 7 feet; owned by U.S. Government and operated by Corps of Engineers, U.S. Army, and National Ocean Service, National Oceanic and Atmospheric Administration.

Facilities along left descending bank of Calumet River:

Rail to Water Transfer Corp., Loading Dock: immediately above E 100th Street bridge; 1,462 feet of berthing space; 27 to 31 feet alongside; deck height, 7 feet; 9 acres open storage; two loading towers, over 3,000 tons per hour each; shipment of coal, and bentonite clay; owned by Rail to Water Transfer Corp. and The Belt Railway Co. of Chicago; and operated by Rail to Water Transfer Corp.

Rail to Water Transfer Corp., Barge Unloading Slip: inner part of N side of Slip No. 2, 2 miles above river mouth; 1,565-foot face; 17 to 21 feet alongside; deck height, 7 feet; 10 acres open storage; two crawler cranes; eight 9- to 22-cubic yard front-end loaders; receipt of coal and coke; owned and operated by Rail to Water Transfer Corp.

Material Service Corp., Yard No. 20 Dock: S side of Slip No. 3; 1,327-foot face; 15 to 20 feet alongside; deck height, 7 feet; 8 acres open storage; receipt and shipment of dry bulk commodities; owned by Material Service Corp.; operated by Material Service Corp. and Coke Contracting Co., Inc.

General Mills, Rialto Grain Elevator Dock: inner part of the N side of Slip No. 4; 854 feet of berthing space; 20 feet alongside; deck height, 7 feet; 2 ¾-million-bushel grain elevator and annex; one marine leg, unloading rate 20,000 bushels per hour; one vessel-loading spout, rate 20,000 bushels per hour; receipt and shipment of grain; owned and operated by General Mills, Inc.

Beemsterboer Slag and Ballast Wharf: outer part of the S side of Slip No. 4; 1,020-foot face; 21 feet alongside; deck height, 7 feet; 30 acres of open storage; receipt of coal, shipment of coke; owned by George J. Beemsterboer, Inc. and operated by Beemsterboer Slag and Ballast Corp.

Continental Grain Co., Elevator B Dock: W side of the river 1 mile above Slip No. 4, 1,050-foot face; 27 feet alongside; deck height, 8 feet; 7½-million-bushel grain elevator; two marine legs, combined unloading rate 20,000 bushels per hour; five vessel-loading spouts, average combined rate 40,000 bushels per hour; receipt and shipment of grain; owned and operated by Continental Grain Co.

Structures across Calumet River and Little Calumet River

**Miles above North Pierhead Light*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	Calumet River							
1	Overhead cable	Power	0.58				146	
2	Elgin, Joliet & Eastern Ry. bridge	Railroad	0.62			200	7	Vertical lift. Clearance up, 125 feet. Note 1.
3	92nd St. bridge	Highway	0.76			180	18	Bascule. Note 1.
4	95th St. bridge	Highway	1.09			204	23	Bascule. Note 1.
5	Baltimore & Ohio RR bridge	Railroad	1.31			135	19	Bascule. Notes 1 and 2.
6	ConRail bridge	Railroad	1.32			138		Vertical lift. Permanently open. Clearance up 120 feet.
7	Overhead cable	Power	1.33				148	
8	ConRail bridge	Railroad	1.34			138	24	Vertical lift. Clearance up 120 feet. Notes 3 and 4.
9	ConRail bridge	Railroad	1.36			138	23	Vertical lift. Clearance up 120 feet. Notes 2 and 3.
10	Chicago Skyway bridge	Highway	1.50			200	125	Fixed.
11	Overhead cable	Power	1.70				156	
12	Overhead cable	Power	1.72				156	
13	100th St. bridge	Highway	1.78			186	18	Bascule. Note 1.
14	106th St. bridge	Highway	2.58			166	19	Bascule. Note 1.
15	Overhead pipeline and conveyor		3.36				130	
16	Overhead cable	Power	3.81				145	
	Turning Basin No. 3		4.63					
17	Overhead cable	Power	5.10				148	
18	Chicago & Western Indiana RR bridge	Railroad	5.24			200	22	Vertical lift. Clearance up 125 feet. Note 1.
19	Torrence Ave. bridge	Highway	5.26			200	24	Vertical lift. Clearance up 126 feet. Note 1.
20	Norfolk & Western Ry. bridge	Railroad	5.59			200	22	Vertical lift. Clearance up 125 feet. Notes 1 and 2.
	Turning Basin No. 5		6.06					
21	130th St. bridge	Highway	6.25			219	29	Fixed.
22	Overhead cable	Power	6.26				49	
23	Overhead cable		6.30				121	
24	Chicago, South Shore & South Bend RR bridge	Railroad	6.33			250	29	Fixed.
25	Overhead cable		6.34					Data not available.
	Thomas J. O'Brien Lock		6.84					
	Little Calumet River							
26	ConRail bridge	Railroad	7.92			250	24	Fixed.
26A	Overhead pipeline	Gas	7.93				25	
27	I-94 bridge	Highway	8.59			250	39	Fixed.
28	Overhead cables	Power	10.23				64	
29	Overhead cable	Power	10.51				88	
30	Chicago & Western Indiana RR bridge	Railroad	10.53			250	24	Fixed.
31	Indiana Ave. bridge	Highway	10.80			250	25	Fixed.

Structures across Calumet River and Little Calumet River (Continued)

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
	Little Calumet River (cont.)							
32	Illinois Central Gulf RR bridge	Railroad	10.97	71	300	300	25	Fixed.
33	Illinois Central Gulf RR bridge	Railroad	10.99	71	300	300	34	Fixed.
34	Overhead cables	Power	11.02				38	
35	Overhead cable	Power	11.07				63	
36	ConRail bridge	Railroad	12.49			250	24	Fixed.
37	Overhead cable	Power	12.50				67	
38	Overhead cable	Power	12.99				48	
39	South Halsted St. bridge	Highway	13.00			226	26	Fixed.
	Junction with Calumet Sag Channel		13.48					
40	Ashland Ave. bridge	Highway	14.07	50	50		13	Fixed.
41	Dan Ryan Expressway (I-57) bridge	Highway	14.12			145	42	Fixed.
42	Riverdale Rd. (Blue Island) bridge	Highway	14.47			52		Fixed. Site of old stone dam.

Note 1.-See **33 CFR 117.1 through 117.49,** chapter 2, for drawbridge regulations.

Note 2.-Bridge is kept in the open position except for the passage of a train.

Note 3.-See **33 CFR 117.1 through 117.59 and 117.389,** chapter 2, for drawbridge regulations.

Note 4.-Bridge is composed of two separate lift spans, operated independently. The lakewardmost span is in a permanently open position.

Cargill Chicago Grain Dock: W side of the river opposite Turning Basin No. 3; 1,145-foot face with additional 695 feet of berthing space immediately downstream; 25 to 29 feet alongside; deck height, 9 feet; 20-million-bushel grain elevator; one marine leg, unloading rate 11,000 bushels per hour; five vessel-loading spouts, combined rate 50,000 bushels per hour; receipt and shipment of grain; owned and operated by Cargill, Inc.

Cargill Vegetable Oil and Salt Dock: immediately above Cargill Chicago Grain Dock; 690 feet of berthing space with dolphins; 14 to 27 feet alongside; deck height, 9 feet; open storage for 50,000 tons of salt; tank storage for over 18 million gallons of molasses and over 1½ million gallons of soybean oil; receipt of molasses and salt, shipment of soybean oil; owned and operated by Cargill, Inc.

Facilities on the right descending bank of the Calumet River:

Ceres Terminals, Iroquois Landing Wharf: S side of the river mouth; 2,825 feet of berthing space; 25 to 27 feet alongside; deck height, 9 feet; 210,000 square feet covered storage; 80 acres open storage; cranes to 200 tons; receipt and shipment of general and containerized cargo, steel products, structural steel, and vehicles; owned by Chicago Regional Port District and operated by Ceres Terminals.

Federal Marine Terminals, North Dock: S side of Turning Basin No. 1 and along river immediately downstream; 671-foot face in basin, 23 to 27 feet alongside; deck height, 9 feet; 426 feet of berthing space along river, 17 to 25 feet alongside, deck height, 7 feet; about 66,000 square feet covered storage; 12 acres open storage; cranes to 200 tons; receipt and shipment of general and containerized cargo, finished steel products, vehicles, and dry bulk commodities; owned and operated by Federal Marine Terminals, Inc.

Marblehead Lime Co. North Dock: 0.3 mile below E 106th Street bridge; 929 feet of berthing space; 18 to 28 feet alongside; deck height, 9 feet; 5 acres open storage; receipt of limestone; owned and operated by Marblehead Lime Co.

Marblehead Lime Co. South Dock: immediately below E 106th Street bridge; 1,030-foot face; 23 to 27 feet alongside; deck height, 7 feet; 5½ acres open storage; receipt of limestone; owned and operated by Marblehead Lime Co.

Interlake Furnace Plant, North Dock: about 0.5 mile above E 106th Street bridge; 1,146 feet of berthing space; 22 to 29 feet alongside; deck height, 10 feet; open storage for 325,000 tons of iron ore; two unloading cranes, combined rate 600 tons per hour; receipt of iron ore pellets; owned and operated by Interlake, Inc.

Interlake Furnace Plant, South Dock: immediately above Interlake Furnace Plant, North Dock; 1,187-foot face; 22 to 29 feet alongside; deck height, 7 and 9 feet; open storage for 900,000 tons of material; two unloading cranes, combined rate 1,850 tons per hour;

receipt of iron ore, iron ore pellets, and limestone; shipment of pig iron; owned and operated by Interlake, Inc.

LTV Steel Co., Ore Dock: immediately above Interlake Furnace Plant, South Dock; 2,288-foot face; 25 to 29 feet alongside; deck height, 11 feet; 13 acres open storage; two hulett-type ore unloaders, combined rate 2,200 tons per hour; receipt of iron ore, limestone, coking coal, ferrous scrap, and pig iron; shipment of steel products; owned and operated by Republic Steel Corp.

Marathon Pipe Line Co., Calumet River Terminal Wharf: SE side of the river .03 mile below Turning Basin No. 5; 750-foot face; 16 to 28 feet alongside; deck height, 8 feet; pipelines extend to tank storage for over 1 million barrels; occasional shipment of petroleum products; owned and operated by Marathon Pipe Line Co.

C-I-L Chemicals Wharf: E side of Turning Basin No. 5; 150 feet of berthing space; 22 feet alongside; deck height, 8 feet; receipt and shipment of sulfuric acid; owned and operated by C-I-L Chemicals, Inc.

Scrap Corp. of America, Butler Dock: SW side of Turning Basin No. 5; 740-foot face; 27 feet alongside; deck height, 6 to 7 feet; shipment and occasional receipt of scrap metal; owned and operated by Scrap Corp of America.

Facilities in Lake Calumet and its entrance channel:

Scrap Corp. of America, Pennsylvania Dock: S side of entrance channel immediately above Turning Basin No. 5; 930-foot face; 27 feet alongside; deck height, 6 to 7 feet; 10 acres open storage; receipt and occasional shipment of scrap metal; owned and operated by Scrap Corp. of America.

Ceres Lake Calumet Harbor South Terminal, Shed No. 3 Wharf: S side of entrance channel immediately above Pennsylvania Dock; 1,034 feet of berthing space; 27 feet alongside; deck height, 8 feet; 72,000 square feet covered storage; 10 acres open storage; cranes to 150 tons; receipt and shipment of general and containerized cargo, automobiles, scrap metal, and other dry bulk commodities; owned by Chicago Regional Port District and operated by Ceres Terminals, Inc.

Lake Calumet Harbor, Shed No. 2 Wharf: immediately above Shed No. 3 Wharf; 660-foot face; 27 feet alongside; deck height, 8 feet; 72,000 square feet covered storage; cranes to 25 tons; moorage of pilot boat and company-owned tugboats, launching and retrieving pleasure craft; owned by Chicago Regional Port District and operated by Lakeland Marina Storage, Inc. and North American Towing Co.

Ceres Lake Calumet Harbor South Terminal, Shed No. 1 Wharf: immediately above Shed No. 2 Wharf; 1,777-foot face; 27 feet alongside; deck height, 8 feet; 173,000 square feet covered storage; cranes to 150 tons; receipt and shipment of conventional and containerized general cargo, various bulk commodities and steel products; owned by Chicago Regional Port District and operated by Ceres Terminals, Inc.

Indiana Grain Division, Gateway Elevator Dock: S side of Lake Calumet Slip No. 1; 1,000-foot face; 27 feet alongside; deck height, 6 feet; 7¾-million-bushel grain elevator; two marine legs, combined unloading rate 20,000 to 24,000 bushels per hour; eight vessel-loading spouts, combined rate 70,000 bushels per hour; receipt and shipment of grain; owned by Chicago Regional Port District and operated by Indiana Grain Division of Indiana Farm Bureau Cooperative.

Continental Grain Co., Elevator C Wharf: N side of Lake Calumet Slip No. 1; 1,020-foot face; 27 feet alongside; deck height, 6 feet; 6¾-million-bushel grain elevator; two marine legs, combined unloading rate 20,000 to 24,000 bushels per hour; eight vessel-loading spouts, combined rate 60,000 bushels per hour; receipt and shipment of grain; owned by Chicago Regional Port District and operated by Continental Grain Co.

Ceres Lake Calumet Harbor North Terminal Wharf: N side of Lake Calumet entrance channel 0.25 mile above Turning Basin No. 5; 1,840 feet of berthing space with dolphins; 23 to 28 feet alongside; deck height, 6 feet; 110,600 square feet covered storage; 30 acres open storage; tank storage for 2,000 tons of lime; cranes to 65 tons; receipt and shipment of steel products; receipt of various bulk materials including ore and lime; owned by Chicago Regional Port District and operated by Ceres Illinois, Inc.

Stolt Terminals, Docks A and B: 0.25 mile above Ceres Lake Calumet Harbor North Terminal Wharf; southeasternmost Dock A, 545 feet of berthing space with dolphins, 27 to 28 feet alongside; Dock B, 675 feet of berthing space with dolphins, 23 to 26 feet alongside; deck height, 6 feet; tank storage for 610,000 barrels; receipt and shipment of petroleum products, chemicals, petrochemicals, animal fats, vegetable oils, and other bulk liquids; owned by Chicago Regional Port District and operated by Stolt Terminals (Chicago), Inc.

EmEsCo Marine Terminal: Lake Calumet Slip No. 2; S side, 1,300 feet of berthing space; N side, 1,425 feet of berthing space; 27 feet alongside; deck height, 8 feet; 30,000 square feet covered storage; 41 acres open storage; two 60-ton cranes can handle 120 tons in tandem; receipt and shipment of general cargo and dry bulk materials; owned by Chicago Regional Port District and operated by EmEsCo.

Medusa Cement Co., Chicago Distribution Terminal Dock: Lake Calumet Slip No. 3, north side; 620-foot permanently moored vessel used as bulk cement storage and transfer facility; 30 feet alongside; deck height, 10 to 25 feet; storage for 20,000 tons of bulk cement; conveyor system for transferring bulk cement to truck loading bins; owned and operated by Cement Transit Co., a subsidiary of Medusa Cement Co.

Supplies.–Complete marine supplies and services are available. Bunker C and diesel fuel are delivered by barge or tank truck. Water is available at many of the wharves.

Repairs.–A graving dock of the American Ship Building Co. is on the E side of the Calumet River just above the E 100th Street bridge. The drydock has a clear length inside at the top of 727 feet, with a width of 78 feet on the sill at the entrance and 87 feet at the top. The depth over the sill is 17 feet at Low Water Datum. The shipyard performs all types of above- and below-the-waterline repairs.

Small-craft facilities.–There are no facilities for small craft on the Calumet River below the Thomas J. O'Brien Lock.

Communications.–Calumet Harbor is served by several major rail lines, several interstate highways, and three airports for passenger and freight service.

Charts 14927, 14926.–From Calumet Harbor N for 11 miles to the mouth of the Chicago River, the shore is bordered by shoals, detached shoal spots, and submerged wrecks extending about 4 miles off. A wreck, covered 13 feet and marked by a buoy, is about 0.3 mile N of the Calumet Harbor breakwater gap. **Clark Point Shoal,** 1.2 miles N of Calumet Harbor breakwater and marked on the outer end by a buoy, has depths of 5 to 9 feet extending about 0.7 mile from shore. A wreck, covered 19 feet, is 1 mile NNE of Clark Point Shoal.

Chicago South District Filtration Plant is on a bulkheaded fill area 1.5 miles NW of the Calumet Harbor breakwater. The plant is protected by a detached breakwater marked on either end by a private light. The area between the breakwater and the plant and the area within 150 feet of the plant's SE bulkhead is a **no mooring-restricted area.** A jetty and a submerged dike, covered 6 feet, extend 0.5 mile NW from the plant to enclose a bathing beach.

Jackson Park Harbor, 2 miles NW of the water filtration plant, is a small-craft refuge comprising an outer harbor and an inner harbor. The entrance to the harbor is protected on the N side by a pier that extends 0.2 mile ENE and bends N for 0.2 mile. In May 1982, it was reported that the outer end of the pier had collapsed into the lake; caution is advised. The bend of the pier is marked by a light. The entrance to the harbor, marked on either side by a private light, has depths of about 3 feet. Outer Harbor (Outer Lagoon) has depths of 6 to 10 feet with shoaling within 150 feet of shore. A narrow channel with depths of 6 feet leads to Inner Harbor (Inner Lagoon). A fixed highway bridge with a clearance of 11 feet crosses the channel. A footbridge of unknown clearance crosses the channel on the E side of the highway bridge. Inner Harbor has depths of about 7 feet. Transient berths, gasoline, water, ice, and sewage pump-out facilities are available in the harbor.

Fifty-ninth (59th) Street Harbor, about 0.6 mile N of Jackson Park Harbor, is entered between parallel piers. The outer ends of the piers are marked by private lights. In 1979, depths of 10 feet were reported in the entrance channel with 5 feet in the basin. A fixed highway bridge with a clearance of 10 feet crosses the entrance channel. Transient berths, sewage pump-out facilities, and launching ramps are available in the basin.

South Park Shoal, with a least depth of 7 feet and marked on the E side by a buoy, is 1.7 miles ENE of the entrance to 59th Street Harbor. **Madison Park Shoal,** with a depth of 13 feet, is 1.2 miles NE of 59th Street Harbor. **Clemson Shoal,** a rock ledge covered 18 feet, is marked on the E side by a lighted bell buoy 0.6 mile NE of South Park Shoal. **Hyde Park Outer Shoal,** covered 8 feet and marked on the E side by a buoy, is 0.7 mile N of South Park Shoal and 0.4 mile NW of Clemson Shoal. **Morgan Shoal,** with an obstruction covered 1 foot, extends 0.7 mile offshore about 1.4 miles N of 59th Street Harbor. A buoy marks the S side of the shoal. **Hyde Park Inner Shoal,** covered 11 feet, is 0.4 mile E of the outer end of Morgan Shoal. **Oakland Shoal,** with a least depth of 7 feet, extends 0.5 mile from shore about 1 mile N of Morgan Shoal.

Burnham Park Harbor, a small-craft basin 2 miles S of the mouth of Chicago River, is enclosed on the E by Northerly Island. **Northerly Island** is an artificial island, attached at the N end to the mainland by a causeway which closes the N end of Burnham Park Harbor. The entrance to the harbor, from S, is marked by a private light on shore SW of the S end of Northerly Island and has a depth of about 16 feet. The harbor has central depths of about 15 feet with shoaling to less than 6 feet toward the E shore and depths of 7 to 10 feet along the piers on the W side of the harbor. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, and hoists are available in the harbor.

A **danger zone** marked by private buoys extends from the S end of the airfield on Northerly Island S across the entrance to Burnham Park Harbor. (See **33 CFR 334.840,** chapter 2, for limits and regulations.)

A bathing beach protected by a submerged dike, covered 1 foot, is on the E side of the N end of Northerly Island. Vessels should not attempt to enter the bathing beach area.

From Northerly Island N to the entrance to Chicago River, numerous scattered shoal spots with depths of 10 to 24 feet are within about 2.5 miles of shore.

Charts 14905, 14927, 14928, 14926.–Chicago Harbor, on the SW shore of Lake Michigan 11 miles N of Calumet Harbor, serves the city of **Chicago, Ill.,** and along with Calumet Harbor, forms one of the largest inland ports in the world. The harbor comprises an outer harbor with outer and inner basins and an inner harbor formed by the **Chicago River** and its branches. While there is some deep-draft traffic in the harbor, barge traffic from the Mississippi River via the Illinois Waterway constitutes the major use of Chicago Harbor. The major commodities handled at the deep-draft facilities in the harbor are general cargo, newsprint, salt, and cement.

Prominent features.–The skyline of Chicago is prominent in general, and its three tallest buildings are conspicuous. The 1,454-foot Sears Tower, 1.3 miles SW of the river mouth, is reported to be the tallest building in the world. Its top is usually obscured by any fog or inclement weather. The white 1,136-foot Standard Oil building is 0.5 mile SW of the river mouth. The dark brown trapezoidal 1,107-foot John Hancock Center 0.9 mile NW of the river mouth has two prominent lighted towers on its roof.

Chicago Harbor Light (41°53.3'N., 87°35.4'W.), 82 feet above the water, is shown from a white conical tower on the S end of the breakwater on the N side of the entrance channel; a fog signal and a radiobeacon are at the light.

Channels.–The harbor consists of an outer harbor of refuge protected by breakwaters on the NE and E sides and an inner basin protected by breakwaters and bulkheads. The outer harbor is entered from Lake Michigan through a dredged entrance channel leading W between the NE and E breakwaters. The entrance channel is marked by buoys, and the ends of the breakwaters are marked by lights. The outer harbor affords access to the municipal pier on the W side of the harbor and to the entrance channel to the inner basin. A small-craft basin, protected by two inner breakwaters, is entered about 1.1 miles SW of the outer harbor basin. The entrance to the basin is marked by lights. A 400-foot-wide breakwater gap at the N end of the harbor is marked by lights. The end of the breakwater on the E side of the gap is partially submerged. Several partially submerged piles are off the end of the breakwater on the W side of the gap. Caution should be exercised when transiting the gap.

The inner basin, on the S side of the mouth of Chicago River, is entered from the W side of the outer harbor through a lock in the jettied channel. The SE guide wall of the lock is marked at the outer end by a light and fog signal. The inner basin and the river may only be entered through the lock, as bulkheads attach the inner end of the lock to shore and to the inner breakwater, and a bulkhead extending from the shore to the inner breakwater separates the inner basin from the small-craft basin SW of the outer harbor. The dredged river entrance channel extends from the lock across the N side of the inner basin through the mouth of the river upstream to Rush Street.

Depths in the inner basin and river entrance shoreward of the Chicago Lock are referred to normal pool level, which is 0.6 foot below Low Water Datum, the plane of reference used in the outer harbor and elsewhere on Lake Michigan.

In October 1981, the controlling depths were 29 feet in the approach channel except for shoaling to 25 feet along the N edge of the channel, thence 25 feet in the outer harbor basin, thence 21 feet in the S half of the channel and 19 feet in the N half of the channel from the outer harbor to the lock, thence in July 1982, 20 feet at midchannel from the lock through the mouth of the river upstream to Rush Street. In 1979, the inner basin had depths of 10 to 21 feet.

In July 1980, the controlling depth in the slip extending from the outer harbor basin along the S side of Navy Pier was 26 feet.

Navigators are cautioned against navigating outside the channel limits in the vicinity of structures protected by stone riprap.

Ogden Slip, at the N end of the inner basin, is N of and parallel to the mouth of the Chicago River. The slip extends about 0.4 mile into the shoreline, and in 1977, had a centerline controlling depth of 16 feet except for shoaling at the W end.

From its mouth, the Chicago River leads W for 1.3 miles to the junction of North Branch and South Branch. From the junction, **North Branch** leads NNW for 1 mile to the junction with **North Branch Canal,** thence these two channels continue NNW, separated by Goose Island, and rejoin at a turning basin at North Avenue. South Branch extends 4 miles S and SW to the junction with **South Fork** and continues SW for 0.8 mile to the Chicago Sanitary and Ship Canal. South Fork extends 1.3 miles S from South Branch.

A Federal project provides for dredged channels in the Chicago River from its mouth to the junction with the North and South Branches, thence in North Branch and North Branch Canal to the turning basin at North Avenue.

In July 1982, the centerline controlling depths were 22 feet in the Chicago River from Rush Street to North Branch, thence 19 feet in North Branch to Ogden Avenue bridge, thence 17 feet to Division Street bridge, thence 15 feet to the turning basin at North Avenue bridge with 7 to 14 feet in the basin except for gradual shoaling at the edges. The centerline controlling depths in North Branch Canal were 11 feet from the S end to Division Street bridge, thence depths decreasing from 11 to 5 feet to the turning basin.

The city of Chicago has improved the channel in North Branch N of the turning basin at North Avenue bridge. In 1977, the centerline controlling depth was 6 feet from the turning basin upstream to Addison Street bridge. In 1957, the channel from Addison Street bridge to Foster Avenue, just inside the S end of North Shore Channel, was dredged to a depth of 8 feet.

The city of Chicago has also improved the channel in South Branch to the South Damen Avenue bridge, including turning basins at the junction with South Fork and on the W side of the South Damen Avenue bridge. In 1977, the centerline controlling depths were 20 feet at midchannel to the Baltimore and Ohio Chicago Terminal Railroad bridge at mile 3.64, thence 15 feet to the turning basin at the juction with South Fork, thence 3 to 14 feet in the basin with the best water on the E side, thence 19 feet on the centerline to the South Damen Avenue bridge with 8 to 23 feet in the basin on the W side of the bridge. Obstructions not disclosed by the soundings may exist in these channels.

South Fork is badly fouled with oily waste. In June 1980, the reported controlling depth was 6 feet to the 35th Street bridge. Obstructions not disclosed by the soundings may exist.

North Shore Channel joins North Branch about 5.5 miles above the turning basin at North Avenue and extends about 8 miles N to the harbor at Wilmette, Ill. The controlling depth in the channel is about 7 feet. A lock which blocks the channel at Wilmette is inoperable and is closed to all navigation.

Measured course.–A 121°-301° measured course, 5,307 feet long, is on the lakeward side of the breakwater on the NE side of the outer harbor. The markers are one vertical white stripe between two vertical red stripes, painted on the breakwater.

Lock.–The Chicago Lock, operated by the U.S. Army Corps of Engineers, at the mouth of the Chicago River was constructed to prevent the flow of the river into the lake. The lock is 600 feet long and 80 feet wide with a depth of 23 feet over the sill. The zero of the water level gages set in the lock walls is at Chicago City Datum, which is 1.4 feet above Low Water Datum. A sound amplifier system is maintained by the lock operators for communication with vessel operators. (See **33 CFR 207.420,** chapter 2, for lock signals and regulations.) Vessels within the lock normally tie up to the S lock wall. However, under adverse weather conditions, such as strong S winds, vessels may wish to use the N lock wall.

Due to the lock at the mouth of the Chicago River and other projects by the Chicago Sanitary District, the flow of the river has been reversed and is now away from the lake, except in North Branch.

Anchorages.–General and small-craft anchorages are in Chicago outer harbor and in the small-craft basin at the SW corner of the outer harbor. (See **33 CFR 110.1, 110.83, and 110.205,** chapter 2, for limits and regulations.)

Danger.–A rock-filled pile pier 3 to 6 feet high, marked at the outer end by a private light, extends 0.5 mile E from shore into the outer harbor, parallel to and 400 feet N of the Chicago River entrance lock.

Caution.–Submerged wrecks are along the W side of North Branch Canal about 0.4 and 0.8 mile above the junction with North Branch. The northernmost wreck is marked by a buoy.

Four Mile Crib, marked by a private light with a fog signal, is 2.6 miles ESE of Chicago Harbor Light.

Bridges.–The city has instituted a system of roving bridgetenders to operate or to assist the resident tender to operate certain bridges across the Chicago River, the North Branch, and the South Branch. The bridges affected are annotated in the tables of bridges, following. At least 30 minutes advance notice is required for the first bridge through which a vessel intends to pass. Thence, telephone advice of vessel movements will be passed from bridge to bridge. Notice may be given to the Bridge Desk of the Chicago Department of Public Works, telephone, 744-4200/4201.

The city of Chicago is attempting to minimize noise in the area bounded by the Michigan Avenue bridge on the E, the Chicago Avenue bridge on the N, and the Roosevelt Road bridge on the S. Pilots of vessels should give the customary whistle signal for the first bridge approached within this area and, when in the draw of the bridge, should inform the bridgetender of their destination. The bridgetenders will then telephone ahead for the necessary bridge openings. Pilots are asked not to signal for other bridge openings in this area unless prompt service is not provided.

Submarine tunnels.–Numerous submarine tunnels cross Chicago River and its branches.

Weather.–(See page T-11 for **Chicago climatological table.**)

Towage.–Tugs for the Chicago area are available from Calumet (South Chicago) Harbor. (See Towage under Calumet (South Chicago) Harbor.)

Chicago is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) A U.S. Public Health Service **outpatient clinic** is in Chicago. (See appendix for address.)

Coast Guard.–A Coast Guard **Captain of the Port** and a **documentation office** are in Chicago. (See appendix for address.) U.S. Coast Guard Air Station, Chicago, is at Glenview, Ill., about 17 miles NW of the mouth of the Chicago River and about 7.5 miles W of Wilmette Harbor. The air station supports Coast Guard surface operations, carries out search and rescue missions, and renders airborne assistance. The air station can be contacted through the nearest Coast Guard station.

Wharves.–The principal use of Chicago Harbor is by barges which reach the port from the Mississippi River via the Illinois Waterway. There are about 100 facilities for barges in the harbor. Only the deep-draft facilities in the harbor are described here. (For complete information on the port facilities, refer to Port Series No. 46, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) All the facilities described have highway and rail connections, and some have water and electrical shore-power connections.

Navy Pier, South Side: outer harbor, N of Chicago River entrance lock; 3,000 feet of berthing space; 26 to 29 feet alongside; deck height, 8 feet; moorage of excursion and sightseeing boats; owned and operated by City of Chicago, Department of the Port of Chicago.

Morton Salt, Elston Avenue Wharf: W side of North Branch, 0.25 mile below North Avenue turning basin; 532-foot face; 14 to 18 feet alongside; deck height, 8 to 12 feet; warehouse storage for 25,000 tons of salt; receipt of salt; owned and operated by Morton Salt Co.

Klemp Corp. Wharf: E side of North Branch just below North Avenue turning basin; 397-foot face; 13 to 17 feet alongside; deck height, 8 feet; rental cranes available; occasional receipt of steel sheets and structural shapes; owned and operated by Klemp Corp.

Dundee Cement Co., Chicago Wharf: E side of North Branch 650 feet above Ogden Avenue bridge; 217-foot face; 15 to 18 feet alongside; deck height, 7

Structures across Chicago River and its Branches

**Miles above W end of Chicago Lock (41°53'18" N., 87°36'28" W.)*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	Main River							
	Ogden Slip		0.22					
1	Lake Shore Drive bridge	Highway	0.32			210	25	Bascule. Note 1.
2	Lake Shore Drive bridge (over Ogden Slip)	Highway	0.42			70	23	Fixed.
3	Columbus Drive bridge	Highway	0.67			180	21	Bascule. Under construction in 1980.
4	Michigan Ave. Bridge	Highway	0.85			195	17	Bascule. Notes 1 and 2.
5	Wabash Ave. bridge	Highway	0.98			192	22	Bascule. Notes 1 and 3.
6	State St. bridge	Highway	1.05			200	21	Bascule. Note 1.
7	Dearborn St. bridge	Highway	1.13			200	22	Bascule. Note 1.
8	Clark St. bridge	Highway	1.21			195	19	Bascule. Notes 1 and 2.
9	La Salle St. bridge	Highway	1.29			195	18	Bascule. Notes 1 and 2.
10	Wells St. bridge	Highway & Railroad	1.37			219	18	Bascule. Note 1.
11	Franklin-Orleans St. bridge	Highway	1.47			190	18	Bascule. Notes 1 and 3.
	South Branch							
12	Lake St. bridge	Highway & Railroad	1.64			206	18	Bascule. Note 1.
13	Randolph St. bridge	Highway	1.73			100	22	Bascule. Note 1.
14	Washington St. bridge	Highway	1.81			155	20	Bascule. Notes 1 and 3.
15	Madison St. bridge	Highway	1.90			172	18	Bascule. Notes 1 and 3
16	Monroe St. bridge	Highway	1.99			156	18	Bascule. Notes 1 and 3.
17	Adams St. bridge	Highway	2.08			148	19	Bascule. Notes 1 and 3.
18	Jackson Blvd. bridge	Highway	2.17			143	20	Bascule. Notes 1 and 3.
19	Van Buren St. bridge	Highway	2.26			166	22	Bascule. Notes 1 and 3.
20	Eisenhower Expressway bridge	Highway	2.35			168	22	Bascule. Note 1.
21	Harrison St. bridge	Highway	2.44			159	22	Bascule. Notes 1 and 3.
22	Polk St. bridge	Highway	2.61			130		Bridge leaves removed. Abutments remain.
23	Roosevelt Rd. bridge	Highway	2.94			170	16	Bascule. Notes 1 and 3.
24	Baltimore & Ohio Chicago Terminal RR bridge	Railroad	3.36			171	21	Bascule. Notes 1 and 3.
25	ConRail bridge	Railroad	3.38			200	22	Bascule. Note 1.
26	18th St. bridge	Highway	3.60			125	22	Bascule. Notes 1 and 3.
27	Amtrak bridge	Railroad	3.77			156	10	Vertical lift. Clearance up 65 feet. Notes 1 and 8.
28	Canal St. bridge	Highway	3.88			167	22	Bascule. Notes 1 and 3.
29	Cermak Rd. bridge	Highway	4.05			129	14	Bascule. Note 1.
30	Dan Ryan Expressway bridge	Highway	4.36			170	64	Fixed.
31	South Halsted St. bridge	Highway	4.47			163	21	Bascule. Notes 1 and 3.
32	South Throop St. bridge	Highway	5.08			131		Bridge removed. Abutments remain.
33	South Loomis St. bridge	Highway	5.29			144	22	Bascule. Notes 1, 3, and 6.
	Junction with South Fork		5.49					
34	South Ashland Ave. bridge	Highway	5.57			183	21	Bascule. Notes 1 and 3.
35	South Damen Ave. bridge	Highway	6.14			140	27	Bascule. Notes 1 and 3.
	Chicago Sanitary and Ship Canal		6.28					

Structures across Chicago River and its Branches (Continued)

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	South Branch (cont.)							
	South Fork of South Branch							
36	Illinois Gulf Central RR bridge	Railroad	5.78			92	17	Fixed.
37	Adlai E. Stevenson Expressway bridge	Highway	5.83			90	31	Fixed.
38	Archer Ave. bridge	Highway	5.86			90	17	Fixed.
39	35th St. bridge	Highway	6.53			121	12	Fixed.
	North Branch							
40	Chicago & North Western Ry. bridge	Railroad	1.76			105	6	Bascule. Note 7.
41	Kinzie St. bridge	Highway	1.81			100	13	Bascule. Note 1.
42	Grand Ave. bridge	Highway	2.00			120	18	Bascule. Notes 1 and 3.
43	Ohio St. bridge	Highway	2.09			138	31	Bascule. Note 1.
44	Erie St. bridge	Highway	2.21			131		Bridge leaves removed. Abutments remain.
45	Chicago Ave. bridge	Highway	2.40			148	18	Bascule. Notes 1 and 2.
	Lower junction with North Branch Canal		2.52					
46	North Halsted St. bridge	Highway	2.65			140	22	Bascule. Note 1.
47	Ogden Ave. bridge	Highway	2.86			138	20	Bascule. Notes 1 and 2.
48	Division St. bridge	Highway	3.30			91	18	Bascule. Notes 1 and 3.
	Turning Basin		3.73					
49	North Ave. bridge	Highway	3.81			125	18	Fixed.
50	Chicago, Milwaukee, St. Paul & Pacific RR bridge	Railroad	4.37			82	9	Swing. Note 1.
51	Cortland St. bridge	Highway	4.48			101	17	Bascule. Note 4.
52	Webster Ave. bridge	Highway	4.85			128	17	Bascule. Note 4.
53	North Ashland Ave. bridge	Highway	4.90			140	18	Bascule. Note 4.
54	Chicago & North Western Ry. bridge	Railroad	5.01			123	19	Bascule. Note 4.
55	Fullerton Ave. bridge	Highway	5.30			93	22	Fixed.
56	North Damen Ave. bridge	Highway	5.59			118	20	Bascule. Note 4.
57	Diversey Parkway bridge	Highway	5.99			95	22	Fixed.
58	Western Ave. bridge	Highway	6.39			95	18	Fixed.
59	Belmont Ave. bridge	Highway	6.76			75	18	Bascule. Note 4.
60	Overhead cable	Power	7.24				48	
61	Addison St. bridge	Highway	7.30			73	18	Fixed.
62	Overhead cable		7.41					Data not available.
63	Irving Park Rd. bridge	Highway	7.83			62	18	Fixed.
64	Montrose Ave. bridge	Highway	8.33			68	17	Fixed.
65	Wilson Ave. bridge	Highway	8.60			73	17	Fixed.
66	Overhead cable		8.72					Data not available.
67	Chicago Transit Authority bridge (Ravenswood)	Railroad	8.73			40	19	Fixed.
68	Lawrence Ave. bridge	Highway	8.94			54	18	Fixed.
69	Argyle St. bridge	Highway	9.23			59	18	Fixed.
70	Overhead pipeline	Water	9.24				18	
	North Shore Channel		9.36					

feet; silo storage for 25,000 tons of cement; receipt of

Structures across Chicago River and its Branches (Continued)

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	North Branch Canal							
71	Overhead cable	Power	2.80				72	
72	Overhead cable	Power	2.81				72	
73	North Halsted St. bridge	Highway	2.85			56	15	Bascule. Note 1.
74	Ogden Ave. bridge	Highway	2.89			132	30	Bascule. Notes 1 and 3.
75	Division St. bridge	Highway	2.99			74	18	Bascule. Notes 1 and 3.
75A	Overhead pipeline.		3.13			137	30	
76	Chicago, Milwaukee, St. Paul & Pacific RR bridge	Railroad	3.54			113	8	Swing. Notes 5 and 6.
	Upper junction with North Branch		3.57					

Note 1.–See 33 CFR 117.1 through 117.59 and 117.391, chapter 2, for drawbridge regulations.

Note 2.–Resident bridgetender assisted by roving tender. Advance notice is required for opening.

Note 3.–Operated by roving bridgetender. Advance notice is required for opening.

Note 4.–See 33 CFR 117.391 (k), chapter 2, for drawbridge regulations.

Note 5.–See 33 CFR 117.391 (f), chapter 2, for drawbridge regulations.

Note 6.–Vertical clearance is for center width of 93 feet.

Note 7.–Bridge kept in open position except for passage of a train.

Note 8.–The bridgetender can be contacted on VHF-FM channel 16 (156.80 MHz), call "South Branch" or WHU-713; or by telephone, 312-930-4125.

bulk cement; owned and operated by Dundee Cement Co.

International Salt Co. Dock: E side of North Branch below Ogden Avenue bridge; 518-foot face; 16 to 21 feet alongside; deck height, 10 feet; covered storage for 8,000 tons of salt; open storage for 7,000 tons of salt; receipt of salt; owned and operated by International Salt Co.

Central District Filtration Plant is on a bulkheaded fill area just N of Navy Pier. The outer ends of the bulkheads are marked by private lights. An area of fish nets, marked by private lighted buoys and floodlighted, adjoins the N bulkhead of the filtration plant.

Supplies.–All types of marine supplies and provisions are available at Calumet Harbor. Tank vessels provide bunker fuel to vessels at their berths.

Foreign-Trade Zone No. 22 is in Chicago. (See chapter 1, Foreign-Trade Zones, and appendix for address.)

Repairs.–The nearest facility for repairs to deep-draft vessels is in Calumet Harbor. Lemont Shipbuilding and Repair Co. has a 2,500-ton vertical lift and makes above- and below-the-waterline repairs to towboats at its facility on the Chicago Sanitary and Ship Canal about 4 miles W of the junction with Calumet Sag Channel. Henry C. Grebe and Co. has a 75-ton marine railway for vessels to 80 feet long on the W side of North Branch about 3 miles above North Avenue turning basin. Above- and below-the-waterline hull repairs and engine repairs are made.

Small-craft facilities.–Gasoline, diesel fuel, water, ice, and launching ramps are available in the small-craft basin in the SW part of the outer harbor. Several other small-craft basins along the Chicago lakefront are described under separate headings.

Communications.–Chicago has excellent rail, highway, and air connections for passengers and freight.

Illinois Waterway.–This waterway is a system of channels connecting Lake Michigan with the **Mississippi River** at Grafton, Ill. From the mouth of the Chicago River to the Mississippi River, the waterway is 327 miles long. The **Illinois River,** from its headwaters at the confluence of the **Des Plaines River** and **Kankakee River** to its mouth at the junction with the Mississippi River, constitutes about 273 miles of the waterway. The waterway may be entered through Chicago Harbor via the Chicago River and the Chicago River South Branch, or through Calumet Harbor via the Calumet River, the **Little Calumet River,** and the **Calumet Sag Channel.** These channels connect with the **Chicago Sanitary and Ship Canal** which leads SW to connect with the Des Plaines River at Lockport. The waterway follows the Des Plaines River to the head of the Illinois River and thence down the Illinois River to the junction with the Mississippi River at Grafton. The Mississippi River below Grafton is discussed in U.S. Coast Pilot 5.

Water Diversion from Lake Michigan.–The State of Illinois is authorized by a United States Supreme Court decree to divert 3,200 cubic feet per second of water from Lake Michigan into the channels of the

Bridges across North Shore Channel

**Miles above W end of Chicago Lock (41°53'18" N., 87°36'28" W.)*

***Clear width in feet proceeding toward Wilmette*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	Junction with North Branch Chicago River		9.36					
1	Foster Ave. bridge	Highway	9.49			59	18	Fixed.
2	Bryn Mawr Ave. bridge	Highway	10.00			62	18	Fixed.
3	Peterson Ave. bridge	Highway	10.53			60	18	Fixed.
4	Lincoln Ave. bridge	Highway	10.62			60	19	Fixed.
5	Devon Ave. bridge	Highway	11.01			67	18	Fixed.
6	Touhy Ave. bridge	Highway	12.02			67	19	Fixed.
7	Howard St. bridge	Highway	12.52			81	19	Fixed.
8	Chicago Transit Authority bridge	Railroad	12.77			101	33	Fixed.
9	Chicago & North Western Ry. bridge	Railroad	12.92			60	19	Fixed.
10	Oakton St. bridge	Highway	13.03			81	19	Fixed.
11	Main St. bridge	Highway	13.53			67	19	Fixed.
12	Dempster St. bridge	Highway	14.03			67	19	Fixed.
13	Church St. bridge	Highway	14.54			67	19	Fixed.
14	Emerson St. bridge	Highway	14.83			67	20	Fixed.
15	Brown Ave. bridge	Highway	15.29			67	20	Fixed.
16	Green Bay Rd. bridge	Highway	15.68			66	20	Fixed.
17	Chicago & North Western Ry. bridge	Railroad	15.69			59	26	Fixed.
18	Lincoln St. bridge	Highway	16.03			60	20	Fixed.
19	Central St. bridge	Highway	16.20			63	20	Fixed.
20	Chicago Transit Authority bridge	Railroad	16.31			45	35	Fixed.
21	Isabella St. bridge	Highway	16.52			67	20	Fixed.
22	Maple Ave. bridge	Highway	16.69			67	21	Fixed.
23	Linden Ave. bridge	Highway	16.86			61	20	Fixed.
24	Sheridan Rd. bridge	Highway	17.00			32	21	Fixed.
	Wilmette Lock		17.00					Inoperable. Closed to navigation.

Illinois Waterway. As a result, the flow of water is normally away from the lake, except during excessive storm runoff or when lake levels are more than 2 feet below Low Water Datum.

In addition to entering the waterway through the Chicago and Calumet Rivers, water from Lake Michigan also enters the waterway through the North Shore Channel at Wilmette Harbor. North Shore Channel then connects with the North Branch of the Chicago River. Vessels, however, may not enter the waterway at Wilmette as the lock there is inoperable.

Channels.–The channels in the Illinois Waterway are maintained at the Federal project depth of 9 feet.

The minimum horizontal clearance, normal to the channel, is 80 feet at the butterfly dam in the Chicago Sanitary and Ship Canal.

Water levels.–Water levels in the Chicago Sanitary and Ship Canal are governed by the controlling works located at the mouth of the Chicago River, in the Calumet River, at Wilmette Harbor, and at Lockport.

Currents.–Currents in Calumet Sag Channel are 0.2 to 0.4 mph with a maximum of 1.3 mph during periods of heavy runoff.

Bridges.–Minimum vertical clearances are 18 feet in the Little Calumet River and 24 feet in Calumet Sag Channel. (For bridge clearances in the Chicago River and the Chicago River South Branch, see the Chicago River bridge tables.) From the South Branch of the Chicago River, the minimum vertical clearance in the Sanitary and Ship Canal is 17 feet to Lemont, thence from Lemont to the junction with the Des Plaines River the minimum clearance is 44 feet. Due to this great change in vertical clearances in the Sanitary and Ship Canal, lake-bound barges change tugs at Lemont for smaller tugs which can navigate under the bridges between Lemont and Lake Michigan. The minimum vertical clearance in the Des Plaines River and the Illinois River is 46 feet above normal pool level (34 feet above extreme high water). (See the bridge tables following.)

Overhead cables.–Numerous overhead cables cross all these channels, but do not obstruct any craft which can pass under the bridges.

Locks.–The Illinois Waterway has nine U.S. Government locks including Chicago Lock at the mouth of the Chicago River. (See **33 CFR 207.300**, chapter 2, for lock regulations in the Illinois Waterway.)

The **Thomas J. O'Brien Lock** is on the W side of the Calumet River about 0.7 mile above Turning Basin No. 5 in Calumet Harbor. A dam with controlling works extends from the lock wall E across the river and allows passage through the lock only. The lock is 1,000 feet long and 110 feet wide with a depth over the sills of 15 feet and a nominal lift of 2 feet. Passage through the lock is governed by flashing traffic signal lights on the W lock wall near the upper and lower lock gates. (See **33 CFR 207.300 and 207.425**, chapter 2, for lock regulations.) With favorable river conditions or when for any reason the lock is not being operated, the lock gates at both ends of the chamber will be fully opened. At such times, navigation through the lock remains under control of the lockmaster and the following regulations apply: for commercial craft, the **speed limit** through the chamber is 4 mph, passing in the lock chamber in either direction is prohibited, and stopping along or tying up to the lock or guide walls is prohibited; for recreational craft, speed through the chamber shall be commensurate with safety but not more than 4 mph, passing commercial craft in either direction is prohibited, and the lock is to be used for through navigation only.

Lockport Lock, in the Chicago Sanitary and Ship Canal at the junction with the Des Plaines River, is 600 feet long and 110 feet wide with a nominal lift of 39.6 feet. An adjoining auxiliary lock is inoperable. Occasionally when heavy precipitation is predicted, the water level in the Sanitary and Ship Canal will be lowered to accommodate the expected water runoff in the canal. When the water in the canal falls below a level of 566.68 feet above mean water level at Father Point (Pointe au Pere), Que., International Great Lakes Datum (1955), or its equivalent, locking operations are suspended for lack of navigable depth over the upper lock sill. During periods of heavy discharge through the controlling works adjacent to the lock, currents in the channel below the lock may be strong enough to break mooring lines or stop the progress of low power vessels and large tows. Vessels moored in the vicinity or transiting the lock should monitor VHF-FM channel 16 (156.80 MHz) for announcements of changes in discharge rates.

The Lockport Controlling Works and a butterfly dam are about 2 miles N of Lockport Lock. The controlling works are on the W bank of the canal just N of the butterfly dam. The sluice gates of the controlling works are equipped with two oscillating red warning lights, one directed each way in the canal so as to be readily visible to mariners. The lights operate when the sluice gates are open and warn mariners to keep to the E side of the channel, clear of the sluice gates. The butterfly dam swings on pivots located in midstream. The dam is normally open and provides a horizontal clearance of 80 feet on either side. The dam is solely a safety device, providing a method of stopping the flow of water in the event of damage to the levee walls or to the Lockport Lock and powerplant complex downstream. Mariners are cautioned to watch out for this structure. Fluctuations in the water level of up to 10 feet may be expected immediately above the Lockport Lock, decreasing to 4 feet at the head of the canal.

Brandon Road Lock, in the Des Plaines River about 4.8 miles below the Lockport Lock, is 600 feet long and 110 feet wide with a nominal lift of 34 feet. Immediately above the lock is a large basin well suited for turning and rearranging tows. The dam at Brandon Road has movable tainter and sluice gates which control the flow and make it possible to maintain a pool level, with small fluctuation above the dam, under normal conditions. Below the dam, an 8¾-foot fluctuation in water level may be expected.

The remaining five locks are in the Illinois River at Dresden Island, Marseilles, Starved Rock, Peoria, and LaGrange. Each lock is 600 feet long and 110 feet wide.

Dresden Island Lock, just below the confluence of the Des Plaines River and the Kankakee River, has a nominal lift of 21.75 feet. The pool above the lock is wide, while that below the lock is quite narrow for about 22 miles. High flows from rainfall runoff and spring thaws can cause the lower pool level to fluctuate drastically; fluctuations of 22 feet may be expected. When conditions of high flow exist, vessels must take into account overhead clearances, vessel draft, and available power. Bridge clearances are reduced so that many towboats cannot pass under the railroad bridge just below the lock. Shallow-draft vessels risk grounding on the lower guide wall which may be submerged. Fully laden barges, drawing 8 to 9 feet, under most circumstances may safely transit the lock by maintaining contact with the lower guide wall even when it is submerged. The outdraft from the dam can pull low or underpowered craft into the dam from the upper pool near the lock. In the lower pool, low or underpowered craft may be driven into the bank or the railroad bridge. When open and lighted, the outdraft sign must be heeded.

Marseilles Lock, 27 miles below Dresden Island Lock, has a nominal lift of 24.25 feet. Spring thaws and rain runoff cause a maximum fluctuation of level of the lower pool of 9 feet. Once a year during this high level condition the lower guide wall is submerged, and shallow-draft vessels risk grounding. During conditions of high flow from the dam, vessels should exercise extreme caution when entering or exiting Marseilles Canal. A hazardous outdraft condition is indicated by an open and lighted outdraft warning sign at the head of the canal.

Starved Rock Lock, 13 miles below Marseilles Lock, has a nominal lift of 18.7 feet. Variation in the lift can be as much as 17 feet depending on flow. Severe outdraft during moderate to high flow conditions makes downbound entry or upbound exiting of

Structures across Calumet Sag Channel

**Miles above Calumet Harbor Pierhead Light*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above water datum		Remarks
				Right	Left	Center	Low	High	
	Junction with Little Calumet River		13.48						
1	Ashland Ave. bridge	Highway	13.98			223	26		Fixed.
2	Overhead cable	Power	14.02				68		
3	Dan Ryan Expressway (I–57) bridge	Highway	14.04			225	41		Fixed.
4	Overhead cable	Power	14.47				43		
5	Division St. bridge	Highway	14.49			225	24		Fixed.
6	Chatham St. bridge	Highway	14.77			225	24		Fixed.
7	Western Ave. bridge	Highway	15.01			225	44		Fixed.
8	Chicago, Rock Island & Pacific RR bridge	Railroad	15.05			225	24		Fixed.
9	Baltimore & Ohio Chicago Terminal RR bridge	Railroad	15.37			225	24		Fixed.
10	Grand Trunk Western RR bridge	Railroad	15.38			225	24		Fixed.
11	Grand Trunk Western RR bridge	Railroad	15.39			225	24		Fixed.
12	Baltimore & Ohio Chicago Terminal RR bridge	Railroad	15.41			225	24		Fixed.
13	Grand Trunk Western RR and Chicago, Rock Island & Pacific RR bridge	Railroad	15.42			225	24		Fixed.
14	Francisco Ave. bridge	Highway	15.63			225	24		Fixed.
15	Overhead cable	Power	15.64				36		
16	Overhead cable	Power	15.82				60		
17	Kedzie Ave. bridge	Highway	16.01			225	24		Fixed.
18	Overhead pipeline		16.04				30		
19	Overhead pipeline		16.22				31		
20	Overhead cable	Power	16.25				54		
21	Overhead cable	Power	16.27				54		
22	Overhead pipeline		16.37				27		
23	Overhead cables	Power	16.81				60		
24	Crawford Ave. bridge	Highway	17.01			198	26		Fixed.
25	Northern Illinois Toll Highway bridge	Highway	17.35			225	39		Twin fixed.
26	Overhead cable	Power	17.48				59		
27	Overhead cable	Power	17.50				58		
28	Cicero Ave. bridge	Highway	18.08			198	24		Fixed.
29	127th St. bridge	Highway	18.81			225	24		Fixed.
30	Ridgeland Ave. bridge	Highway	20.47			225	24		Fixed.
31	Overhead cable	Power	21.44				67		
32	Overhead cable	Power	21.45				44		
33	Overhead cable	Telephone	21.47				35		
34	Harlem Ave. bridge	Highway	21.48			225	24		Fixed.
35	Norfolk & Western Ry. bridge	Railroad	22.13			225	43		Fixed.
36	Overhead cable	Telegraph	22.16				37		
37	Southwest Highway bridge	Highway	22.25			188	26		Fixed.
38	Overhead cable	Power	22.27				62		
39	Overhead cable	Power	22.33				72		
40	Overhead cable	Power	22.37				72		
41	96th Ave. bridge	Highway	24.56			225	24		Fixed.
42	104th Ave. bridge	Highway	25.56			225	24		Fixed.
43	Overhead cable	Telephone	28.58				39		
44	Overhead cable	Power	28.60				68		
45	Sag Highway bridge	Highway	28.76			225	39		Fixed.

Structures across Calumet Sag Channel (Continued)

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above water datum*		*Remarks*
				Right	*Left*	*Center*	*Low*	*High*	
46	Overhead cable	Power	28.90				100		
47	Illinois Gulf Central RR bridge	Railroad	29.01			225	24		Fixed.
48	Overhead cable	Power	29.19				62		
	Junction with Chicago Sanitary and Ship Canal		29.44						

the lock difficult to dangerous. When the lower pool reaches a level of 450 feet above MSL 1929, shallow-draft vessels risk grounding on the lower guide wall or the bullnose on the lower left lock wall. Tows should exit the lock at a low rate of speed to prevent backlash.

Peoria Lock, 73 miles below Starved Rock Lock, and LaGrange Lock, 77 miles below Peoria Lock, have nominal lifts of 11 and 10 feet, respectively. These locks were designed to accommodate flooding and have Chanoine Wicket dams for pool level control. The dams are lowered to the river bottom when the lower pool levels rise and approach the upper pool levels. When the dams are lowered to the river bottom, about 40 percent of the time, they are said to be in the "open pass" or "navigable pass" status. Tows should exit these locks at a low rate of speed to prevent backlash.

Special restrictions are in effect concerning all locks and dams of the Illinois Waterway and the Chicago Lock at the mouth of the Chicago River. The restrictions are as follows: Boat crews, repairmen, and company officials will be permitted to embark or disembark at the above locations only after identification has been established satisfactorily to the lockmaster. Such identification can be established by the vessel master or pilot on duty personally signing a Necessity for Admission form which will be furnished by the lockmaster. The privilege of entering the lock premises is for the express purpose only of embarking or disembarking from a vessel, and shall not be construed as permission to use the reservation for waiting or any other purpose. Supplies, packages, and parcels, including laundry, will not be accepted by the lockmaster for delivery to or from vessels.

Navigation Charts.–Charts of the Illinois Waterway is a booklet of charts showing this maintained waterway from the Mississippi River at Grafton, Ill., to Lake Michigan at Chicago, Ill. The booklet is published and sold by the U.S. Army Corps of Engineers, Rock Island District. (See appendix for address.)

Light List.–Aids to navigation of the Illinois Waterway are contained in Light List, Volume IV, Great Lakes, and Light List, Volume V, Mississippi River System, for above and below the Lockport Lock, respectively. The Light List is available from the U.S. Government Printing Office. (See appendix for address.)

From Chicago Harbor N for 13.5 miles to Wilmette, the shore is bordered by shoals and detached spots that extend 4 miles off. Carter H. Harrison Crib, 2.1 miles NNE of Chicago Harbor Light, is connected to William E. Dever Crib, close NE, by a bridge with a clearance of about 27 feet. William E. Dever Crib is marked by a private light with a fog signal.

A submerged bulkhead, covered 2 feet, parallels the shoreline about 450 feet off, from 1.9 to 2.8 miles N of the Chicago River entrance. The bulkhead is marked at intervals by 5-foot-high piles. Small craft should not attempt to cross the bulkhead. At the S end of the bulkhead, a private light marks North Avenue Jetty.

Diversey Harbor is a small-craft basin about 3 miles N of Chicago River entrance. The approach to the harbor is marked by a private 269° lighted range. A floating breakwater in ruins is E of the entrance S of the range line. The controlling depths are about 9 feet in the entrance channel with 8 feet in the basin and shoaling toward shore. The entrance channel is crossed by a fixed highway bridge with a clearance of 14 feet. Vessel traffic control lights on the bridge are directed either direction in the channel and operate as follows: red, 3 minutes; amber, 1 minute; green, 3 minutes. These lights operate 24 hours a day during good weather, but only the amber light is shown in foul weather. Gasoline is available in the basin.

Caution.–Shotgun firing is conducted intermittently from the Lincoln Park Gun Club property just N of Diversey Harbor, creating a danger zone 700 feet along the shore extending into the lake 600 feet. When firing is in progress, two red flags are displayed from standards near the shoreline and a red pennant from a flagpole. The limits of the firing area are marked by private buoys. A range officer will keep the area under observation during firing periods and will cause firing to cease when vessels find it necessary to enter the area, but all persons are

Structures across Chicago Sanitary and Ship Canal

**Miles above W end of Chicago Lock (41°53'18" N., 87°36'28" W.)*

***Clear width in feet proceeding away from the lake*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above water datum		Remarks
				Right	Left	Center	Low	High	
1	South Western Ave. bridge	Highway	6.7			155	22		Vertical lift. Note 1.
2	Baltimore & Ohio Chicago Terminal RR bridge	Railroad	6.9			120	17		Bascule. Note 1.
3	South California Ave. bridge	Highway	7.3			128	17		Bascule. Note 1.
4	Illinois Central Gulf RR bridge	Railroad	7.7		85		19		Swing. Note 1.
5	South Kedzie Ave. bridge	Highway	7.8			130	22		Fixed.
6	Grand Trunk Western Ry. bridge	Railroad	8.4	45	80		18		Swing. Note 1.
7	South Pulaski Rd. bridge	Highway	8.9			140	22		Bascule. Note 1.
8	Belt RR bridge	Railroad	9.7		97		17		Swing. Note 1.
9	South Cicero Ave. bridge	Highway	10.0			140	18		Bascule. Note 1.
10	South Central Ave. bridge	Highway	11.1			170	42		Fixed.
11	Atchison, Topeka & Sante Fe Ry. bridge	Railroad	12.5	130	85		18		Swing. Note 1.
12	South Harlem Ave. bridge	Highway	13.3			140	23		Bascule. Note 1.
13	Adlai E. Stevenson Expressway bridge	Highway	13.9			160	41		Twin fixed.
14	Lawndale Ave. bridge	Highway	14.3			160	39		Twin fixed.
15	Baltimore & Ohio Chicago Terminal RR bridge	Railroad	15.1		90	113	18		Swing. Note 1.
16	La Grange Road (Justice) bridge	Highway	17.9			260	40		Twin fixed.
17	Northern Illinois Toll Highway bridges	Highway	18.1			242	39		Twin fixed.
19	Willow Springs Rd. bridge	Highway	19.4			165	39		Bascule.
20	Sag Highway bridge	Highway	23.2			160	39		Fixed.
	Calumet Sag Channel		23.8						
21	Overhead pipeline		24.0				55		
22	Illinois Central Gulf RR bridge, Lemont	Railroad	26.7			160	19		Swing. Note 1.
23	Lemont High-Rise Bridge	Highway	26.7			227	47		Fixed.
24	Overhead pipeline		30.7				44		
25	Romeo Rd. bridge	Highway	31.1			160	17		Swing. Note 2.
26	Overhead pipeline		31.9				46		
27	Butterfly dam		34.2	80	80				
28	9th St. bridge, Lockport	Highway	34.6			225	47		Fixed.
29	16th St. bridge, Lockport	Highway	35.2		160		4		Swing.
	Lockport Lock		36.2						
30	Lockport Lock bridge	Foot	36.2			110	51		Fixed.
	Junction with Des Plaines River		37.1						Note 3.

Note 1.–This bridge will not be opened for navigation.
Note 2.–Bridge is operated by a roving bridgetender who can be reached at the Ruby St. bridge in Joliet, telephone, 815-722-3120.
Note 3.–See the table of bridges across Des Plaines River.

cautioned to enter the area during these periods only when absolutely necessary.

Belmont Harbor is a small-craft basin 4 miles N of Chicago River entrance. The entrance to the basin is marked on the N side by private lights. The entrance channel has a controlling depth of about 17 feet, and the basin has central depths of 17 to 24 feet with shoaling toward shore. Gasoline, diesel fuel, ice, and sewage pump-out facilities are available in the basin.

An 8-foot shoal, marked on the E side by a buoy, is 0.3 mile NE of the entrance to Belmont Harbor. An 11-foot shoal is 0.8 mile NE of the entrance.

Charts 14905, 14927, 14926.–The shore from Belmont Harbor N for 1.3 miles to Montrose Harbor is

Bridges across Des Plaines River

**Miles above W end of Chicago Lock (41°53′18″N., 87°36′28″W.)*
***Clear width in feet proceeding away from Lake Michigan*

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above water datum*		*Remarks*
				Right	*Left*	*Center*	*Pool level*	*High water*	
	W end of Chicago Sanitary and Ship Canal		37.1						
1	Lockport-Elgin, Joliet & Eastern Ry. bridge	Railroad	37.2			225	24	20	Vertical lift. Note 1.
2	Joliet-Ruby St. (SR 53) bridge	Highway	38.5	200			16	13	Bascule. WZQ-8761. Notes 2, 3, 5, and 9.
3	Joliet-Jackson St. bridge	Highway	38.8			150	16	13	Bascule. Notes 4 and 5.
4	Joliet-Cass St. (US 30) bridge	Highway	39.1			150	16	13	Bascule. Notes 4 and 5.
5	Joliet-Jefferson St. bridge	Highway	39.4			150	16	13	Bascule. Notes 4 and 5.
6	Joliet-Chicago Rock Island & Pacific RR bridge	Railroad	39.6			150	9	6	Vertical lift. KUF-907. Notes 6, 8, and 10.
7	Joliet-McDonough St. (US 6, US 52) bridge	Highway	39.8			150	16	14	Bascule. WZQ-8761. Notes 2, 4, 5, and 9.
8	I-80 bridges	Highway	40.3			300	46	43	Twin fixed.
	Brandon Road Lock and junction with Illinois and Michigan Canal		41.2						
9	Rockdale-Brandon Rd. bridge	Highway	41.4			110		8	Bascule. WZQ-8761. Notes 8 and 9.
10	Overhead conveyor		42.3			480		48	Suspension.
11	Channahon-I-55 bridges	Highway	49.3			420	47	41	Twin fixed.
	Junction with Kankakee River, Head of Illinois River		54.3						Note 7.

Note 1.–Bridge kept in the open position except for the passage of a train.

Note 2.–Bridge clearance gages have been installed at Joliet near the upstream end of the retaining wall above Ruby Street for the guidance of downbound vessels and on the left bridge pier downstream of McDonough Street for the guidance of upbound vessels. The gages are set to show the actual clearance between the water surface and the low steel of the bridges for the center 80-foot width of span. A sign over the gages reads, "Closed Vertical Clearance for Center 80 Feet of Span Joliet City Bridges." Masters of all vessels that can safely pass under the bridges in closed position are requested to do so and refrain from opening the bridges whenever possible.

Note 3.–Clear heights are for 105-foot width.

Note 4.–Clear heights are for 80-foot width.

Note 5.–See 33 CFR 117.1 through 117.59 and 117.395, chapter 2, for drawbridge regulations.

Note 6.–Span raises 41.5 feet above heights shown. Several collisions have occurred at this bridge, and vessel masters are urged to reduce speed and exercise caution when passing the bridge.

Note 7.–For continuation, see the table of bridges across the Illinois River.

Note 8.–See 33 CFR 117.1 through 117.49, chapter 2, for drawbridge regulations.

Note 9.–The bridgetender monitors VHF-FM channel 16 (156.80 MHz) and works on channel 13 (156.65 MHz).

Note 10.–The bridgetender monitors VHF-FM channel 16 and works on channel 14 (156.70 MHz).

paralleled 16 feet off by a submerged shore-protection bulkhead, covered about 4½ feet. The bulkhead is marked at 20-foot intervals by 5½-foot-high piles. Small-craft should not attempt to cross the bulkhead.

Montrose Harbor is a small-craft basin about 5 miles N of Chicago Harbor. The entrance to the basin, from S, is protected by two breakwaters, each marked on the outer end by a private light. The entrance channel has depths of about 18 feet with 17 feet in the basin. Sewage pump-out facilities are available in the basin.

A breakwater, marked at the inner and outer ends by private lights, extends N from the point of land which forms the N and E sides of Montrose Harbor.

Wilson Avenue Crib, marked by a private light with a fog signal, is 2.6 miles E of Montrose Harbor entrance. An automatic wave recorder, covered 6½ feet, is about 400 feet NW of the crib.

A shoal with rock outcroppings covered 15 to 18 feet extends 3.5 miles offshore from about 1 to 4 miles N of Montrose Harbor.

Grossepoint Light (42°03.8′N., 87°40.5′W.), 119 feet above the water, is a prominent private aid

Bridges across the Illinois River

**Miles from W end of Chicago Lock (41°53'18" N., 87°36'28" W.)*
***Clear width in feet proceeding away from Lake Michigan*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above water datum		Remarks
				Right	Left	Center	Pool level	High water	
	Head of Illinois River at junction of Des Plaines and Kankakee Rivers		54.3						
	Dresden Island Lock		55.7						
1	Divine-Elgin, Joliet & Eastern Ry. bridge	Railroad	56.6			113	26	8	Vertical lift. Span raises 30.3 feet above heights shown. Notes 1 and 5.
2	Morris-State Route 47 bridge	Highway	63.8			350	50	34	Fixed.
3	Seneca-Chessie System RR bridge	Railroad	73.1			141	21	9	Vertical lift. Span raises 26.2 feet above heights shown. Notes 1 and 5.
4	Seneca-State Route 170 bridge	Highway	74.5			354	47	37	Fixed.
	Marseilles Canal		80.2						
5	Marseilles bridge	Highway	80.3			225	46	46	Fixed.
	Marseilles Lock		82.6						
6	Ottawa-Hilliard Highway bridge	Highway	87.5			484	47	37	Fixed. Clear heights are for 300-foot width. Being removed in 1981.
6A	Ottawa-State Route 23	Highway	87.5			466	47	37	Fixed. Under construction. Will replace Hilliard Highway bridge.
7	Ottawa-Burlington Northern bridge	Railroad	87.8			167	21	12	Vertical lift. Span raises 26.4 feet above heights shown. WRD-810. Notes 5 and 7.
	Starved Rock Lock		96.2						
8	Utica-State Route 178 bridge	Highway	97.6			356	63	44	Fixed.
8A	LaSalle-Route 412 bridge	Highway	101.5			582	66	44	Fixed. Under construction in October 1983.
9	LaSalle-Illinois Central RR bridge	Railroad	101.7			260	61	43	Fixed.
11	LaSalle (State Route 351) bridge	Highway	102.5			249	26	8	Vertical lift. Span raises 55.2 feet above heights shown. WZQ-8761. Notes 5 and 8.
12	Peru-U.S. Route 51 bridge	Highway	104.3			400	62	44	Fixed.
13	Spring Valley-State Route 89 bridge	Highway	108.7			350	60	43	Fixed.
	Illinois and Mississippi Canal		117.0						
15	Hennepin-I-180 bridge	Highway	119.4			350	59	42	Fixed.
16	Hennepin-State Route 26 bridge	Highway	119.6			350	59	42	Fixed.
17	Henry-State Route 18 bridge	Highway	131.2			350	59	42	Fixed.
18	Lacon-State Route 17 bridge	Highway	138.0			350	59	41	Fixed.
19	Chillicothe-Atchison, Topeka & Sante Fe Ry. bridge	Railroad	145.3			360	58	41	Fixed.
20	Peoria-McCluggage Highway bridge	Highway	161.4			411	66	58	Fixed. Under construction.

Bridges across the Illinois River (Continued)

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above water datum*		*Remarks*
				Right	*Left*	*Center*	*Pool level*	*High water*	
21	Peoria-McCluggage Highway (U.S. Routes 24, 150) bridge	Highway	161.4	359	359	411	65	48	Fixed.
22	Peoria-Murray-Baker (I-74) bridge	Highway	164.5			500	65	48	Fixed.
23	Peoria-Franklin St. bridge	Highway	164.9			121	31	15	Bascule. WZQ-8761. Notes 1, 5, and 9.
24	Peoria-Atchison, Topeka and Santa Fe RR bridge	Railroad	165.0		118		13	3	Swing. Note 2.
25	Peoria-Cedar St.-State routes 8, 29, 116	Highway	165.6			280	78	62	Fixed arch. Clear heights are for 210-foot width.
26	Peoria-Peoria & Pekin Union Ry. bridge	Railroad	166.5			140	21	4	Bascule. WQX-651. Notes 1, 5, 6, and 10.
27	Shade Lohmann I-474 bridge	Highway	169.2			500	64	48	Fixed.
	Peoria Lock		169.5						
28	Pekin-bridge-State route 9	Highway	174.3			513			Bridge under construction.
29	Pekin Bridge	Highway	174.3			210	28	7	Vertical lift. Span raises 55.8 feet above heights shown. Being removed in 1982. Maintained in open position. WZQ-8761. Notes 5 and 11.
30	Pekin-Chicago & North Western Ry. bridge	Railroad	176.0			153	30	9	Vertical lift. Span raises 41.7 feet above heights shown. KVF-831. Notes 5 and 10.
31	Havana-U.S. Route 136, State routes 78, 97, bridge	Highway	207.6			350	67	47	Fixed.
32	Beardstown-Burlington Northern bridge	Railroad	238.4			300	54	34	Vertical lift. Note 4.
33	Beardstown-U.S. Route 67, State route 100 bridge	Highway	239.3			526	69	49	Fixed.
	LaGrange Lock		247.0						
34	Meredosia-State Route 104 bridge	Highway	255.9			554	72	47	Fixed.
35	Valley City-Norfolk & Western Ry. bridge	Railroad	265.9			300	32	6	Vertical lift. Span raises 45.5 feet above heights shown. KTR-857. Notes 6 and 10.
36	Valley City	Highway	266.9			535	71	55	Fixed. Under construction.
37	Valley City	Highway	267.1			540	71	55	Fixed. Under construction.
38	Florence-U.S. Route 36, State route 100 bridge	Highway	271.2			202	26	4	Vertical lift. Span raises 56.8 feet above heights shown. WZQ-8761. Notes 1, 5, and 10.
39	Pearl-Illinois Central Gulf RR bridge	Railroad	284.0			315	20	0	Vertical lift. Span raises 69.5 feet above heights shown. KLU-797. Notes 5 and 10.
40	Hardin-State Route 100 bridge	Highway	305.7			300	25	8	Vertical lift. Span raises 56.9 above heights shown. WZQ-8761. Notes 1, 5, and 10.
	Junction with Mississippi River		327.2						

Note 1.–Bridge signals are as follows: alternately flashing upper and lower vertically arranged green lights indicate draw is to open immediately, and alternately flashing right and left horizontally arranged red lights indicate draw cannot be opened immediately or must be closed immediately.

Note 2.–Swing span has been removed.

Note 3.–Bridge is kept in the open position except for the passage of a train.

Note 4.–See 33 CFR 117.1 through 117.99 and 117.393, chapter 2, for drawbridge regulations. Bridge normally open, remotely controlled. Contact KLU-801 on VHF-FM channel 16 (156.80 MHz), before transiting to ensure bridge remains open during passage.

Note 5.–See 33 CFR 117.1 through 117.49, chapter 2, for drawbridge regulations.

Note 6.–In April 1983, the bascule bridge was being replaced by a lift span with design clearances of 20.3 feet down and 66 feet up, and 300 feet horizontal relative to the channel axis.

Note 7.–The bridgetender monitors VHF-FM channel 16 (156.80 MHz) and works on channels 7A (156.35 MHz) and 14 (156.70 MHz).

Note 8.–The bridgetender monitors VHF-FM channel 16 and works on channels 6 (156.30 MHz), 10 (156.50 MHz), 12 (156.60 MHz), 13 (156.65 MHz) and 14.

Note 9.–The bridgetender monitors VHF-FM channel 16 and works on channels 6, 12, and 13.

shown from a white conical tower with a red roof close to shore 7.3 miles N of Montrose Harbor and 1 mile S of Wilmette. An automatic wave recorder, 13 feet high, is close offshore 0.25 mile SE of the light.

Wilmette, Ill., is a small-craft harbor at the N terminous of North Shore Channel, about 13.5 miles N of Chicago Harbor. The harbor is used primarily by pleasure craft. The white dome of the Baha'i Temple 0.3 mile SW of the harbor entrance is prominent.

Channels.–The harbor is entered NW from deep water in Lake Michigan between two piers to an inner harbor basin. A breakwater extending E from the shore N of the entrance piers provides some protection from N winds. The outer ends of the piers and the breakwater are marked by private lights. In July 1978, the entrance channel was reportedly being maintained to a depth of 8 feet during the boating season. In 1971, the controlling depth in the basin was about 3 feet.

Caution.–When approaching the harbor during periods of reduced visibility, mariners are cautioned against mistaking the breakwater for the N pier. Vessels approaching from the N are advised to pass well clear of the N pier before hauling around to the entrance.

Sluice Gate.–To regulate the flow of water from Lake Michigan into North Shore Channel, a sluice gate has been constructed at the SW end of the harbor basin by the Chicago Sanitary District. A navigation lock in the structure is inoperable and blocks access from the harbor to the channel. Since there may be considerable current through the harbor when the gate is open, an oscillating red warning light is operated near the gate.

Wilmette Coast Guard Station is on the N side of the harbor basin.

Small-craft facilities.–Limited transient berths, gasoline, sewage pump-out facilities, and limited supplies are available in the harbor. A hoist can handle 30-foot craft for minor repairs.

Chart 14905.–From Wilmette, the shore extends 21 miles NNW to Waukegan. This reach is low for the first 5 miles, thence has 70-foot bluffs N to Waukegan. In the vicinity of Wilmette, shoals extend 2.3 miles offshore, but over the rest of the reach, the shoal border is less than 2 miles wide. A wreck, covered 15 feet and marked by a lighted bell buoy, is 2 miles NE of Wilmette. A rocky spot, covered 22 feet and marked on the E side by a lighted bell buoy, is about 6 miles NE of Wilmette. **Glencoe Shoal,** covered 8 feet, is 1 mile offshore 5.5 miles NNW of Wilmette. A detached 21-foot spot is 3.3 miles offshore about 3 miles N of Glencoe Shoal. In 1958, a wreck was reported 3.4 miles offshore 5.3 miles N of Glencoe Shoal.

Great Lakes Naval Training Center Harbor, about 3.5 miles S of Waukegan, is a protected area of about 100 acres enclosed by breakwaters on the N, E, and S. The harbor is used by training vessels and by pleasure craft of personnel stationed at the base. Permission to enter the harbor must be obtained from the **harbormaster,** who may be contacted on VHF-FM channel 16 (156.80 MHz), call Great Lakes Harbor, or at the boathouse, Building 13, in the inner basin. The harbor is available as a refuge during storm or other emergency.

The N breakwater extends E from the shore and joins the E breakwater, which then extends S to the entrance channel. The S breakwater extends E from shore to the entrance channel. The outer ends of the breakwaters are marked by lights. In 1977, the entrance channel had a centerline controlling depth of 12 feet. A channel through the outer harbor has a depth of about 13 feet. From the outer harbor a channel leads between piers to an inner basin. The outer ends of the piers are marked by lights, and the channel is marked by a **302°45'** lighted range. The channel to the inner basin has a depth of about 14 feet.

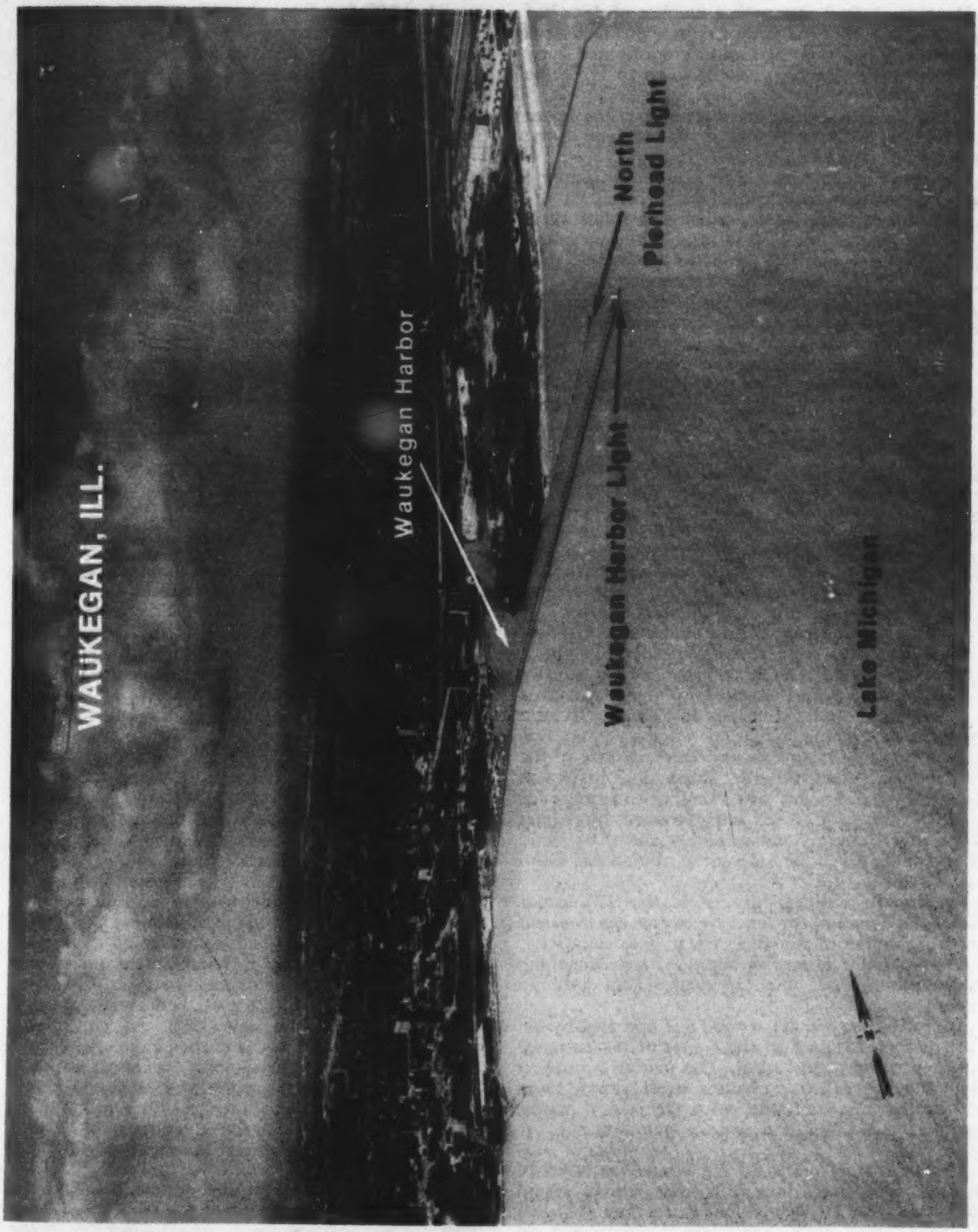
A **restricted area** extends 1 mile into Lake Michigan, from Great Lakes Naval Training Center Harbor S breakwater N for 1.6 miles. A **danger zone** for rifle firing practice extends 2 miles into the lake just N of the harbor. (See **33 CFR 334.820 and 334.830,** chapter 2, for limits and regulations.)

Charts 14904, 14905.–Waukegan, Ill., is a city and small commercial harbor on the W side of Lake Michigan 35 miles N of Chicago Harbor. The principal cargoes handled in the port are bulk cement and gypsum rock. Prominent are stacks at the Commonwealth Edison Co. 1.5 miles N of the harbor and the light on the intake crib 2.1 miles N of the harbor.

Waukegan Harbor Light (42°21.6'N., 87°48.8'W.), 36 feet above the water, is shown from a white cylindrical tower with an attached building on the outer end of the S pier; a fog signal and a radiobeacon are at the light. The light is sometimes difficult to distinguish from shore lights in the background.

Channels.–The harbor is entered through a dredged entrance channel leading W from deep water in Lake Michigan between parallel piers to an inner harbor basin. A breakwater extending from shore on the N side of the entrance channel protects the entrance from NE seas. The outer ends of the piers and breakwater are marked by lights. In May-June 1982, the controlling depths were 19 feet in the S half of the entrance channel, thence 15 feet at midchannel in the channel between the piers; thence 14 feet in the basin except for shoaling along the edges. The entrance channel is subject to shoaling caused by the drift of sand from the N. Above the dredged area, the inner basin has depths of 14 to 20 feet with shoaling to 8 feet and less at the N end.

The inner basin is not adapted for anchorage, but vessels may moor to the revetment on the W side or in the slips N of the basin. During severe storms, vessels are sometimes required to moor in the middle of the slips and away from the docks to prevent damage to the vessels and revetments. Mariners are cautioned against navigating outside the channel limits in the vicinity of structures protected by stone riprap.


WAUKEGAN, ILL.
Waukegan Harbor
North Pierhead Light
Waukegan Harbor Light
Lake Michigan
N

Dangers.–A foul area with a number of detached rock ledges is E of the harbor entrance. The area is marked by a buoy on the E side and a lighted buoy on the N side. Mariners should keep to N of the lighted buoy.

Storm warning signals are displayed at the water filtration plant on the N side of the entrance to the inner basin. (See chart.)

Caution.–Sudden wind direction or barometric pressure changes may cause water levels in the harbor to rise or fall as much as 3 feet in a short time.

Harbor regulations.–Federal regulations specify a **speed limit** of 4 mph (3.5 knots) in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

Local harbor regulations have been established by the Waukegan Port District and are enforced by the harbormaster whose office is at South Harbor Marina. Copies of the regulations can be obtained from the General Manager, Waukegan Port District, 3500 N. McAree Road, Waukegan, Ill. 60085. A **speed limit** of 5 mph (4.3 knots) is enforced in the inner and outer harbor of Waukegan.

Towage.–Tugs for Waukegan are available from Calumet (South Chicago) Harbor and from Sturgeon Bay. (See Towage under those ports.)

Wharves.–Waukegan has two deep-draft facilities in the slip on the NW side of the inner basin. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

Huron Cement Dock: S side of the slip; 620-foot face; about 16 to 17 feet alongside; deck height, 7 feet; covered storage for 32,000 tons of bulk cement; receipt of bulk cement; owned by Waukegan Port Authority and operated by Huron Cement Division of National Gypsum Co.

Gold Bond Building Products Dock: N side of the slip; about 750 feet of berthing space; 15 to 16 feet alongside; deck height, 4 to 5 feet; open storage for 120,000 tons of gypsum rock; owned by Elgin, Joliet, and Eastern Railway and operated by Gold Bond Building Products, Division of National Gypsum Co.

Small-craft facilities.–Marinas in the SW corner and at the N end of the inner basin provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Hoists to 25 tons are available for hull and engine repairs.

South Harbor Marina, owned and operated by the port district, is just S of the S pier of the entrance channel to the main harbor. The marina is entered from the S between protecting breakwaters. Over 750 berths are avaialable, with electricity, water, gasoline, diesel fuel and sewage pump-out.

Chart 14904.–The shore from Waukegan N for 16 miles to Kenosha is low with some woods behind the beach. Shoals extend no more than 0.8 mile offshore. Small craft should avoid the submerged rock off the mouth of Barnes Creek, 11.3 miles N of Waukegan.

About 1.5 miles N of Waukegan, a breakwater extends 1,200 feet from shore to protect the intake channel of the Waukegan Generating Station, Public Service Co. The outer end of the breakwater is marked by a private light. A fish net is placed annually, between April and August, from the outer end of the breakwater to the shore about 1,200 feet SW. The net shows above the water and is marked by private buoys and floats. Three lighted stacks at the generating station are prominent from offshore.

The towers of the Commonwealth Edison Co. nuclear powerplant at Zion, 6 miles N of Waukegan, are reported to be prominent from offshore.

The **State boundary** between Illinois and Wisconsin is about 9 miles N of Waukegan and 7 miles S of Kenosha.

Runaway Bay is a small-craft harbor immediately N of the Illinois-Wisconsin State boundary. The harbor entrance channel is marked on either side by a private light. In 1978, the reported controlling depth was 4 feet in the entrance channel with 3 to 12 feet in the basin. Transient berths, gasoline, diesel fuel by truck, water, ice, electricity, sewage pump-out facilities, limited marine supplies, and a launching ramp are available in the basin. A 40-ton hoist for craft to 18 feet wide is available for hull, engine, and radio repairs.

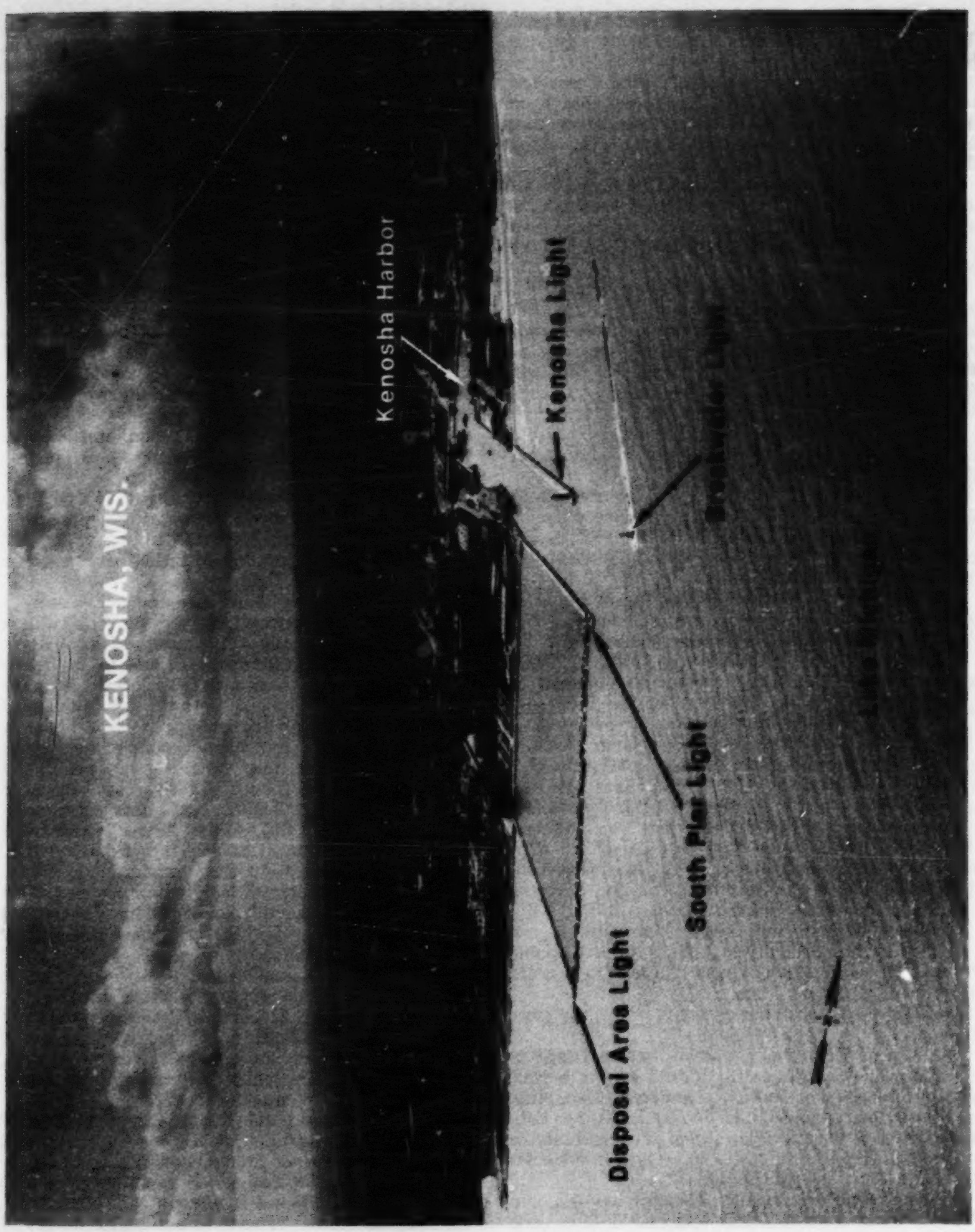
Kenosha Harbor, 50 miles N of Chicago Harbor at the original mouth of **Pike Creek,** is a small commercial harbor which also serves as a base for commercial fishermen and pleasure craft. The harbor serves the city of **Kenosha, Wis.**

Prominent features.–Prominent from the lake are a blue tank on the N side of the entrance channel, the southwesternmost stack on the S side of the entrance channel, and the radio tower 0.6 mile SW of Kenosha Light.

Kenosha Light (42°35.4'N., 87°48.5'W.), 50 feet above the water, is shown from a red cylindrical tower on the outer end of the N pier; a fog signal is at the light. Kenosha Light and the light on the SE end of the detached breakwater form a range useful for approaching the harbor entrance.

Channels.–The harbor is entered through a dredged entrance channel leading from deep water in Lake Michigan between parallel piers to an inner harbor basin. A detached breakwater on the N side of the entrance channel protects the entrance from NE seas. The entrance channel is marked by buoys, and the outer ends of the piers and breakwater are marked by lights. In June 1980, the controlling depths were 22 feet in the entrance channel except for shoaling to 10 feet in the NW corner off Kenosha Light, thence 23 feet between the piers and revetments to the inner basin, thence 19 feet in the basin except for shoaling along the edges, thence 13 feet to the 50th Street bridge except for shoaling to 8½ feet on the SW edge.

The entrance channel is subject to shoaling caused by the drift of sand from the N. Severe E gales cause considerable disturbance in the basin. The inner basin is not adapted for anchorage, but vessels may moor to the revetments surrounding it. Mooring to the breakwater or piers is prohibited.


KENOSHA, WIS.
Kenosha Harbor
Kenosha Light
Breakwater Light
Lake Michigan
South Pier Light
Disposal Area Light

A diked disposal area is on the S side of the S pier. The SE corner of the area is marked by a private light.

Caution.–The original mouth of Pike Creek has been bulkheaded and filled. The creek has been diverted and now enters the harbor basin at the foot of 52nd Street through a 13-foot pipe. The creek flows into the harbor with velocities to 2 mph.

Bridge.–The 50th Street bridge at the N end of the dredged part of the basin has a fixed span with a clearance of 16 feet. Overhead cables of unknown clearance cross the basin immediately N and S of the bridge.

Harbor regulations.–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.) Local harbor regulations have been established by the city of Kenosha. Copies of regulations may be obtained from City of Kenosha, Transportation Dept., Room 104, 625 52nd Street, Kenosha, Wis. 53140.

Towage.–Tugs for Kenosha are available from Milwaukee and Sturgeon Bay. (See Towage under those ports.)

Wharves.–Kenosha Harbor has two deep-draft facilities at the inner end of the entrance channel. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operator.)

Morelli Overseas Export Service North Dock: N side of the inner end of the entrance channel; 1,050-foot face; 21 to 26 feet alongside; deck height, 5½ feet; 17,000 square feet covered storage; 75,000 square feet open storage; receipt and shipment of general cargo; owned by Port of Kenosha and operated by Morelli Overseas Export Service.

Morelli Overseas Export Service South Dock: S side of the inner end of the entrance channel and S side of the inner basin; 1,950-foot face; 26 feet alongside; deck height, 5½ feet; 100,000 square feet covered storage; 360,000 cubic feet cold storage; 700,000 square feet open storage; receipt and shipment of general cargo; owned by Kenosha Auto Transport, Division of Jupiter Corp., and operated by Morelli Overseas Export Service.

Supplies.–Marine supplies and provisions are available at Kenosha. Light bunkering is available by truck from local oil companies. Minor repairs are available from local firms.

A **Coast Guard station** is on the E side of the inner basin.

Small-craft facilities.–A marina on the S side of the 50th Street bridge provides transient berths, gasoline, water, ice, electricity, and marine supplies. A mobile hoist can handle 50-foot craft for hull, engine, and electronic repairs. The municipal marina on the N side of the 50th Street bridge provides transient berths and a launch ramp.

From Kenosha, the shore is bluff for 10 miles N to Racine. The shoal border is less than 1 mile wide with several detached spots beyond. About 1 mile N of Kenosha, 20- and 23-foot spots are 1 and 1.6 miles offshore, respectively. A wreck, covered 17 feet, is 1.3 miles offshore 3.8 miles N of Kenosha. Detached 21-foot spots are 1 mile and 1.4 miles offshore, 2.4 and 3.8 miles S of Racine, respectively. Prominent in this stretch are a stack and drive-in theater 1.2 and 4.4 miles N of Kenosha, respectively.

Charts 14904, 14925.–**Racine Reef,** SE of the entrance to Racine Harbor, is a large shoal extending from 0.6 to 2.3 miles offshore. The reef has a least depth of 1 foot over a crib near its center. **Racine Reef Light** (42°43.6′N., 87°44.2′W.), 56 feet above the water, is shown from a white skeleton tower on a concrete crib on the E side of the reef; a fog signal is at the light. The light should not be passed close aboard even by shallow-draft vessels. The W end of the reef is marked by a lighted buoy.

Racine Harbor, serving the city of **Racine, Wis.,** is at the mouth of the **Root River,** 60 miles N of Chicago Harbor and 21 miles S of Milwaukee Harbor. The harbor is used primarily by pleasure craft and fish tugs.

Prominent features.–The pink and blue storage tanks on the N side of the river mouth are prominent.

Racine North Breakwater Light (42°44.1′N., 87°46.3′W.), 53 feet above the water, is shown from a red square pyramidal skeleton tower, upper half enclosed, on the outer end of the N breakwater; a fog signal is at the light.

Channels.–A dredged entrance channel leads from Lake Michigan between converging breakwaters through the outer basin to the mouth of Root River and thence upstream for about 0.7 mile to just below Fourth Street. The outer ends of the breakwaters are marked by lights. The pier on the N side of the river mouth is marked on the outer end by a light. In August 1979, the midchannel controlling depths were 18 feet from deep water in the lake to the mouth of the river, thence 16 feet to just below the Main Street bridge, thence depths decreasing to 7½ feet at the head of the project. Above the dredged channel, depths are about 8 feet to Fourth Street, thence decreasing to 3 feet at Marquette Street bridge, thence depths of 1 to 4 feet for about 2.5 miles above Marquette Street bridge. There are rocks on the river bottom just inside the mouth between the N channel limit and the N revetment.

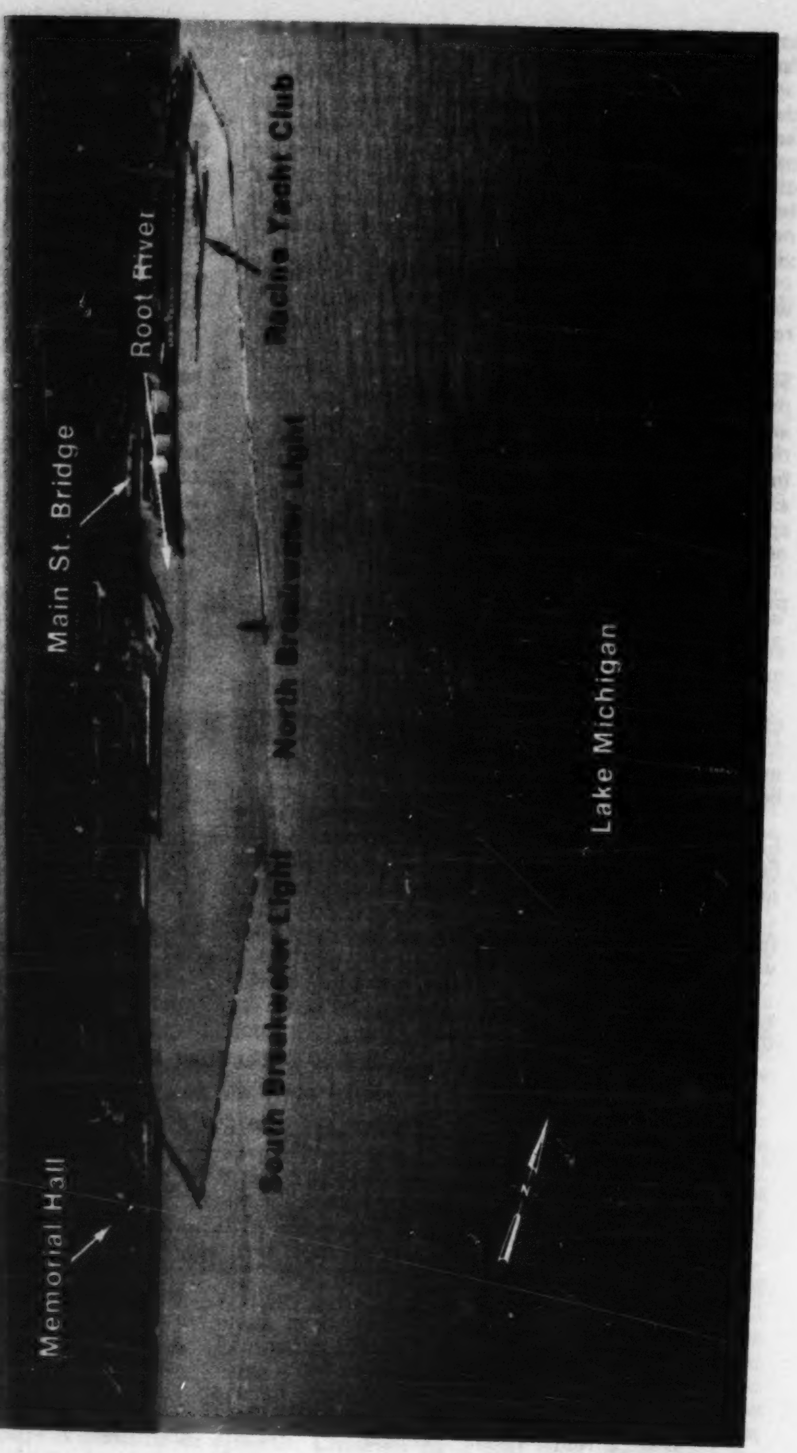
The outer basin is not adapted for anchorage by large vessels but reduces wave action in the lower section of the river. Mooring to the breakwaters and the pier on the N side of the river mouth is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

The channel inside the river is narrow and tortuous, making navigation for large vessels difficult. Currents in the river attain velocities to 3 mph.

Anchorages.–State-designated small-craft anchorages are on the N and S sides of the outer basin. Contact the Racine County Water Patrol on the N side of the river mouth for details.

Dangers.–Several detached shoal spots with depths of 21 to 24 feet are 0.3 to 1.1 miles NE of the harbor entrance. Racine Harbor is subject to consid-

RACINE, WIS.


Memorial Hall
Main St. Bridge
Root River
Racine Yacht Club
North Breakwater Light
South Breakwater Light
Lake Michigan
N

erable wave action during periods of strong winds from NE to SE.

Local bridge regulations.–In case street traffic is delayed by reason of the draws of either bridge having been continuously opened for 5 minutes or more for the passage of boats, the draws may be closed, but shall be again opened for the passage of boats as soon as practicable; provided however, that no boat shall be delayed for a longer period than 15 minutes.

In case the draw cannot be immediately opened when a signal is given, a red flag or ball by day or a red light at night shall be conspicuously displayed.

All boats when passing any bridge in the city shall be moved past as expeditiously as is consistent with proper movement in the river, and in no case shall any boat, while passing any bridge and obstructing the same, remain or obstruct the passage across such bridge more than 5 minutes, nor shall any boat be so anchored or fastened as to prevent the free and speedy opening of any bridge or the free passage of other boats through the same.

No person shall in any manner obstruct the free passage over and upon the bridges of the city.

No person except the bridgetender or person authorized to act in his stead shall open or in any manner interfere with opening any bridge.

The person having charge of any boat desiring to move past any bridge shall allow a reasonable time for the opening of such bridge, and no person shall move any boat against any bridge or draw thereof before the bridge is opened.

No person shall willfully injure or damage any bridge or abutment, or part thereof. No person shall fasten or hitch any boat, timber or other floating material to any bridge or abutment.

No person shall damage or remove any portion of the improved shore protection of any navigable waters within the city.

Any person who violates any provision of this section shall, upon conviction thereof, be liable for the cost of repairing any damage resulting from such violation, in addition to the penalty provided for violation of this code.

Racine is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Harbor regulations.–Federal regulations specify a **speed limit** of 4 mph (3.5 knots) in the harbor. (See **33 CFR 162.120**, chapter 2, for regulations.)

Local harbor regulations are under the control of the harbor commission and are enforced by the **harbormaster** who can be reached through the Racine County Water Patrol. A **slow-no wake speed** is enforced within the harbor limits. Copies of the regulations can be obtained from the Commissioner of Public Works, City Hall, 730 Washington Avenue, Racine, Wis. 53403.

Towage.–Tugs for Racine are available from Milwaukee and Sturgeon Bay. (See Towage under those ports.)

Wharf.–Pugh Oil & Coal Co. receives salt at a 500-foot wharf on the N side of the river mouth. The wharf has reported depths of 18 feet alongside. There is open storage for 40,000 tons of salt.

Small-craft facilities.–Marinas at Racine provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Hoists to 30 tons are available for hull, engine, and electronic repairs.

From Racine Harbor, the shore is bluff and curves NE for 3.5 miles to **Wind Point.** Shoals extend about 0.9 mile offshore. Detached 21- and 20-foot spots are 1.1 miles NE and 1.3 miles NNE of the entrance to Racine Harbor. **Wind Point Light** (42°46.9'N., 87°45.5'W.), 111 feet above the water, is shown from a white conical tower with attached dwelling on the point.

Wind Point South Shoal, with a least depth of 17

Structures across Root River at Racine

**Miles above the mouth of the river*

***Clear width in feet proceeding upstream*

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
1	Main St. bridge	Highway	0.29			90	9	Bascule. Note 1.
2	State St. bridge	Highway	0.53			80	20	Bascule. Note 1.
3	Overhead cable	Power	0.97				53	
4	Marquette St. bridge	Highway	1.17	58	58	58	9	Fixed.
5	Overhead cable	Power	1.27					Data not available.
6	Overhead pipeline		1.32			137	12	
7	Sixth St. bridge	Highway	1.46			49	24	Fixed.
8	Chicago & North Western Ry bridge	Railroad	1.65	107	107		17	Fixed. Note 2.

Note 1.–See **33 CFR 117.1 through 117.59 and 117.1095**, chapter 2, for drawbridge regulations.

Note 2.-Neither draw is accessible. The depth would only permit passage of very small boats.

feet, is 1.3 miles SE of Wind Point Light. The shoal is marked on the E side by a buoy.

Chart 14904.–Wind Point North Shoal, with boulders covered 14 feet and marked on the SE side by a lighted buoy, is 1.7 miles NE of Wind Point Light. All vessels should keep well outside the buoy, especially in heavy weather.

From Wind Point, the shore trends NW and then N for 18 miles to Milwaukee Harbor. The shore in this stretch is bluff. For the first 7 miles of the stretch, shoals extend about 0.6 mile offshore, thence N to Milwaukee, the shoal border is irregular and extends as much as 1.5 miles from shore. A detached bank with a least depth of 18 feet is from 1.2 to 2 miles offshore in the vicinity of South Milwaukee, about 9.5 miles N of Wind Point. The greatest extent of the shoal border is 3.5 miles SE of the entrance to Milwaukee Harbor and is marked at the outer edge by a lighted bell buoy. Vessels should stay outside the buoy. A wreck, covered 27 feet, is marked by a lighted buoy 5.3 miles NE of South Milwaukee.

Caution.–A firing area for small caliber weapons is at the Racine County Line Rifle Club Range about 3.5 miles NW of Wind Point. The firing creates a caution zone about 3,500 feet wide extending about 3 miles into the lake. Mariners should navigate the area with caution and consult the Local Notice to Mariners for latest information.

Oak Creek Harbor is a private harbor of the Wisconsin Electric Power Co., about 5.6 miles NW of Wind Point. Four stacks at the powerplant, the southernmost lighted, are prominent from the lake. A fill area for coal storage extends about 900 feet into the lake and has a combined water intake and docking slip along its S side. The S side of the slip is protected by a jetty. The approach to the harbor is marked by a private **269°** lighted range. In 1977, the reported controlling depth was 21 feet in the approach with 20 feet in the N half of the slip and 15 feet in the S half. In 1978, it was reported that the slip was being maintained to a depth of about 25 feet. Strong currents may exist at the W end of the slip due to a large volume of plant intake water.

About 3 miles N of Oak Creek Harbor, the city of Milwaukee has constructed a sewage treatment plant on a landfill that extends about 1,000 feet into the lake. A stack about 0.5 mile S of the plant is prominent.

South Milwaukee, Wis., is at the mouth of **Oak Creek,** about 8.5 miles S of the entrance to Milwaukee Harbor. Clay bluffs N and S of the creek mouth have an elevation of 60 feet or more. A dilapidated pier extends 200 feet lakeward from the N side of the creek mouth. Another pier extends from the S side of the mouth and then bends SW to enclose a small-craft basin. The S side of the basin is enclosed by a breakwater extending from shore. In 1978, the reported controlling depths were 6 feet in the entrance and 4 feet in the basin. Gasoline is available in the basin.

Charts 14904, 14924.–Milwaukee Harbor, serving the city of **Milwaukee, Wis.,** is one of the major ports on the Great Lakes. The harbor is at the mouth of the **Milwaukee River,** which flows into **Milwaukee Bay,** a broad indentation on the W side of Lake Michigan about 80 miles N of Chicago Harbor. The harbor comprises an outer harbor formed by breakwaters paralleling the shore and an inner harbor in Milwaukee River, **Menomonee River,** and **Kinnickinnic River.** The principal cargoes handled in the port are general cargo, steel products, coal, cement, and grain. Freighters and petroleum tankers ply the year round between this port and other ports on S Lake Michigan.

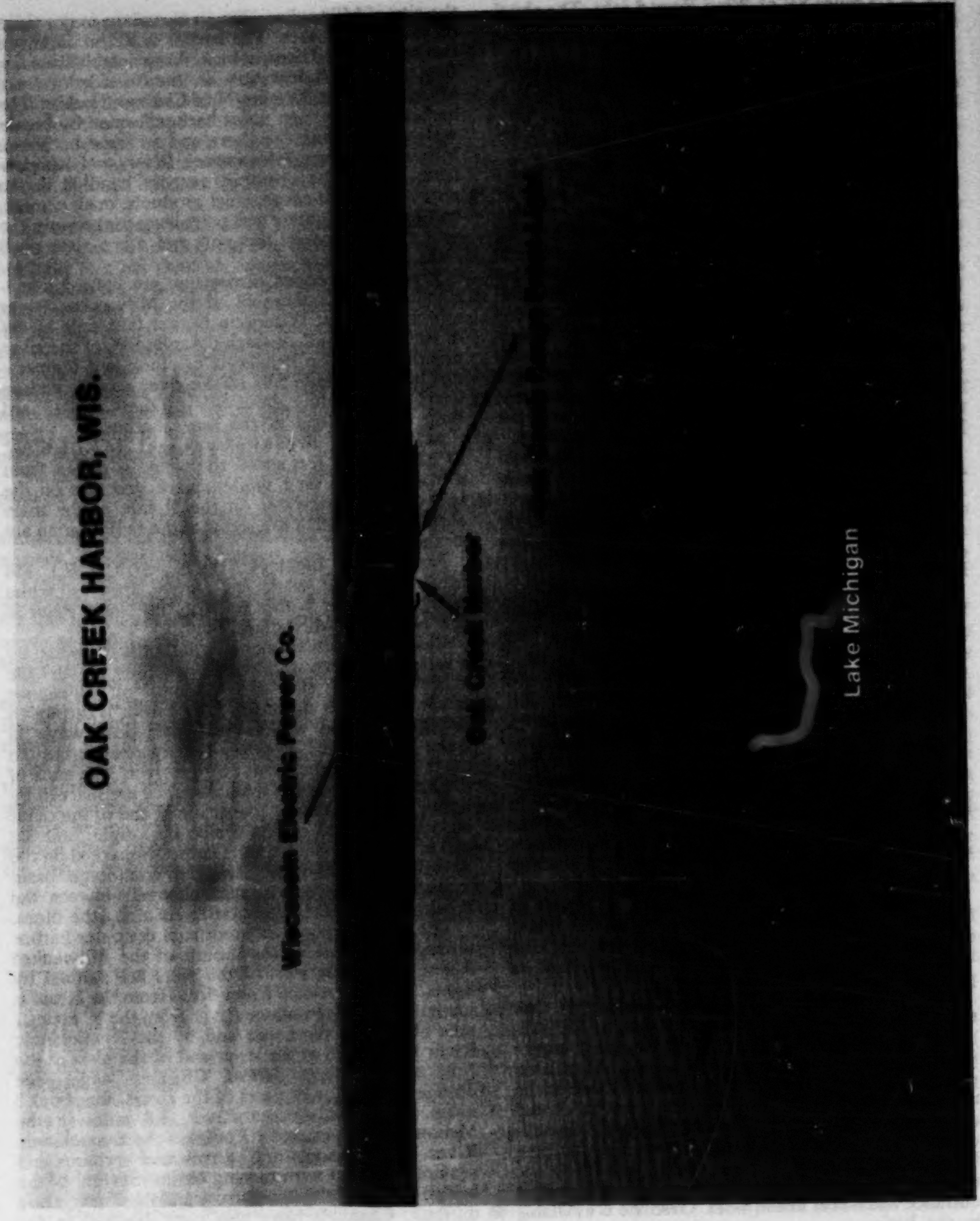
Prominent features.–Prominent are lighted television towers 4.5 miles N of the Milwaukee River mouth, the First Wisconsin Center 0.95 mile NNW of the river mouth, a stack 0.4 mile SW of the river mouth, the Allen-Bradley Co. clock and temperature towers 1 mile SW of the river mouth, and an apartment building close SW of the Coast Guard Base at the S end of the outer harbor.

Milwaukee Breakwater Light (43°01.6'N., 87°52.9'W.), 61 feet above the water, is shown from a black lantern on a white square structure on the end of the breakwater on the N side of the main entrance channel; a fog signal and a radiobeacon are at the light.

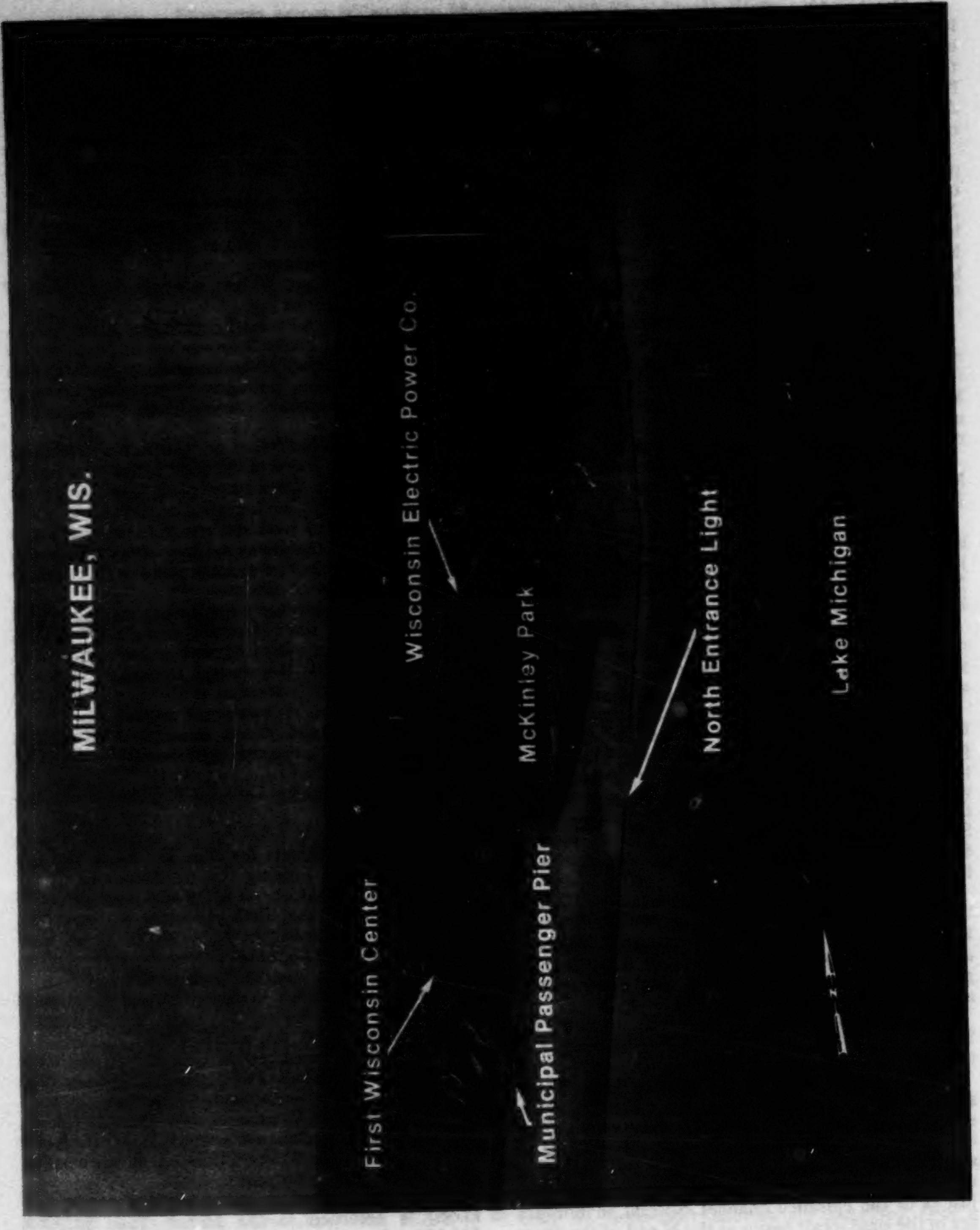
North Point Light (43°03.9'N., 87°52.3'W.), 154 feet above the water, is shown from a white octagonal tower with a red roof on **North Point** at the N end of Milwaukee Bay.

Channels.–Milwaukee outer harbor is protected by a series of breakwaters which generally parallel the shore on either side of the mouth of Milwaukee River. The main entrance to the harbor is through a dredged channel which leads from deep water in Lake Michigan between the breakwaters across the outer harbor to the mouth of the river. The ends of the breakwaters at the main entrance are marked by lights. The breakwater gap at the N end of the outer harbor is marked on the S side by a light, and the gap at the S end of the outer harbor is marked on the N side by a light. A dredged anchorage basin extends S from the entrance channel between the breakwater and the deep-draft piers along the shore.

The inner harbor is entered from the outer harbor through the piers at the mouth of the Milwaukee River. The outer ends of the piers are marked by lights. The Milwaukee River flows from the N and is joined by the Menomonee River from the W about 1 mile above the pierheads and by the Kinnickinnic River from the S at the inner end of the piers at the NW end of **Jones Island.** Channels have been dredged in the lower parts of the rivers, for about 3 miles in the Milwaukee River, 1.8 miles in the Menomonee River, and 1.3 miles in the Kinnickinnic River. The channels are narrow and tortuous and are not provided with turning basins. Several of the bridge openings are also narrow and their navigation difficult. Channels have also been dredged in the **South Menomonee Canal** and **Burnham Canal,** which branch S from the Menomonee River just above its mouth.



OAK CREEK HARBOR, WIS.
Wisconsin Electric Power Co.
Oak Creek Harbor
Lake Michigan


MILWAUKEE, WIS.
Wisconsin Electric Power Co.
McKinley Park
North Entrance Light
Lake Michigan
First Wisconsin Center
Municipal Passenger Pier

In October 1981, the controlling depths were 30 feet from deep water in the lake between the breakwaters, thence 27 feet in the entrance channel through the outer harbor except for shoaling to 19 feet 100 feet NE of Milwaukee Pierhead Light, thence 27 feet in the outer harbor anchorage area except for shoaling to 26 feet in the NW part.

In July-August 1982, the midchannel controlling depths in the Milwaukee River were 25 feet through the channel between the piers at the mouth, thence 22 feet to the Chicago and North Western Railway bridge, thence 20 feet to the junction with the Menomonee River, thence 18 feet to about 400 feet below St. Paul Avenue bridge, thence in 1977, 17 feet to the upstream limit of the Federal project at the North Humboldt Avenue bridge.

In July 1982, the controlling depths in the Menomonee River were 16 feet (19 feet at midchannel) from the junction with Milwaukee River to the Muskego Avenue bridge, thence 15 feet (17 feet at midchannel) to the head of the Federal project 0.6 mile above the Sixteenth Street bridge.

In July 1982, the controlling depths in South Menomonee Canal and Burnham Canal were 20 and 19 feet at midchannel, respectively.

In August 1982, the controlling depths in Kinnickinnic River were 23 feet at midchannel from the junction with Milwaukee River to the Chicago and North Western Railway bridge, thence 20 feet to the South Kinnickinnic Avenue bridge.

In the outer harbor, mooring to the breakwaters or piers is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by rock riprap along their sides.

In the outer harbor, the city of Milwaukee has dredged an 18-foot approach channel to the Municipal Passenger Pier N of the entrance channel. A private **295°** lighted range marks the approach to the pier. S of the entrance channel, the city has dredged the pier slips on the W side of the anchorage basin. South Slip No. 1 has been dredged to 26 feet and South Slip Nos. 2 and 3 have been dredged to 27 feet.

Municipal Mooring Basin, also known as Kinnickinnic Basin, is on the SE side of the Kinnickinnic River about 0.6 mile above the mouth. The basin, used primarily for the winter moorage of vessels, has general depths of 25 to 30 feet with lesser depths along the edges.

A diked disposal area extends from shore in the SW corner of the outer harbor. The SE corner of the area is marked by a light.

Anchorages.–Deep-draft vessels may find anchorage in the dredged part of the outer basin S of the entrance channel. Medium-draft vessels may anchor in the N part of the outer harbor, taking care to avoid dropping or dragging anchor in the vicinity of the submerged cables which cross the outer harbor just N of the entrance channel. Special anchorages are in the small-craft basins at the N end of the outer harbor and shoreward of the County Park Commission's breakwater which parallels the shore S of the outer harbor. (See **33 CFR 110.1 and 110.80**, chapter 2, for limits and regulations.)

In April 1983, sunken wrecks were reported in the special anchorage areas behind the County Park Commission's breakwater 0.2 mile, 174° from South Shore Park Breakwater Light in about 42°59'58"N., 87°53'04"W., and 1.3 miles, 139° from South Shore Park Breakwater Light in about 42°59'17.6"N., 87°52'04.0"W.

Dangers.–During rough weather, the entire breakwater system may be obscured by wave action. At these times, the only safe entrance is through the main entrance channel.

A wreck, covered 40 feet, is about 3.8 miles E of the harbor entrance.

Caution.–Fish nets in the N outer harbor are a hazard. A water intake for a sewage disposal plant is on the S side of the Milwaukee River about 800 feet W of the Interstate 794 highway bridge and may, at times, cause hazardous crosscurrents for small vessels.

Navigators are advised to use extreme caution when entering slips of the general cargo terminals in the outer harbor. Ships accidentally penetrating the dock wall or ships having a large rake angle of the bow can strike the steel and concrete superstructure of Interstate 794 highway bridge. This could result in heavy ship or bridge damage and possible personal injury or loss of life.

Vessels moored in the outer harbor may be subject to severe surging when there are strong NNE to ENE winds. During periods of adverse weather, the Coast Guard recommends that vessels moored in the outer harbor be adequately manned at all times to maintain mooring lines and/or safely get underway.

Currents.–Currents attain velocities to 4 mph in the main entrance channel and 3 mph in the river channels.

Weather.–(See page T-12 for **Milwaukee climatological table.**)

Towage.–Tugs to 1,600 hp are available at Milwaukee. Arrangements for tugs are made through the Great Lakes Towing Co. dispatcher in Cleveland (800-321-3663) or via VHF-FM remote antenna, or through the JMS Towing Service, Inc. dispatchers in Milwaukee (414-647-1135) or Sturgeon Bay (414-743-9611).

Milwaukee is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard.–Milwaukee Coast Guard Station, Group Office, and Base are at the S end of the outer harbor. A **Marine Safety Office** is in Milwaukee. (See appendix for address.)

Harbor regulations.–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120**, chapter 2, for regulations.) Local harbor regulations are enforced by the **harbormaster.** Copies of these regulations may be obtained from the

Structures across Milwaukee, Menomonee, and Kinnickinnic Rivers

**Miles above Milwaukee Pierhead Light*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	Milwaukee River							
1	Lake Freeway (I-794) bridge	Highway	0.19			200	120	Fixed. Note 2.
	Junction with Kinnickinnic River		0.38					
2	Chicago & North Western Ry. bridge	Railroad	0.59	87	87		7	Swing. Note 1.
3	Broadway St. bridge	Highway	0.79			90	12	Bascule. Under construction 1981. Notes 1 and 3.
4	Water St. bridge	Highway	0.94			130	13	Bascule. Note 1.
	Junction with Menomonee River		1.01					
6	St. Paul Ave. bridge	Highway	1.21			50	14	Vertical lift. Note 1.
7	East-West Exp. (I-794) bridges	Highway	1.26			116	28	Twin fixed.
8	Clybourn St. bridge	Highway	1.28			52	14	Vertical lift. Note 1.
9	Michigan St. bridge	Highway	1.37			50	12	Vertical lift. Clearance up 28 feet. Note 1.
9A	Skywalk	Pedestrian	1.41			160	32	Fixed.
10	Wisconsin Ave. bridge	Highway	1.46			50	12	Vertical lift. Clearance up 28 feet. Note 1.
11	Wells St. bridge	Highway	1.61			77	9	Bascule. Note 1.
12	Kilbourn Ave. bridge	Highway	1.70			100	14	Bascule. Note 1.
13	State St. bridge	Highway	1.79			80	14	Bascule. Note 1.
14	Overhead cable		1.88					Data not available.
15	Juneau Ave. bridge	Highway	2.06			90	14	Bascule. Note 1.
16	Park Freeway bridges	Highway	2.13			116	35	Twin fixed.
17	Cherry St. bridge	Highway	2.29			80	14	Bascule. Note 1.
18	Pleasant St. bridge	Highway	2.58			50	14	Vertical lift. Clearance up 27 feet. Note 1.
19	Holton St. bridge	Highway	2.84			79	64	Bascule. Note 1.
20	Humboldt Ave. bridge	Highway	3.22				17	Fixed. Head of navigation.
	Menomonee River							
21	Chicago, Milwaukee, St. Paul & Pacific RR bridge	Railroad	1.05	75			8	Swing. Note 1.
22	North Plankinton Ave. bridge	Highway	1.08			90	14	Bascule.
23	North Sixth St. bridge	Highway	1.37			71	30	Bascule. Note 1.
24	North-South Freeway (I-94) bridge	Highway	1.61			140	100	Fixed.
25	Muskego Ave. bridge	Highway	1.95			70	10	Bascule. Note 1.
26	Sixteenth St. bridge	Highway	2.14			120	35	Bascule. Note 1.
27	Twenty-fifth St. bridge	Highway	2.8	65	70			
28	Chicago, Milwaukee, St. Paul & Pacific RR bridge	Railroad	2.91				9	Fixed. Head of navigation.

Legislative Reference Bureau, Room 404, City Hall, 200 East Wells Street, Milwaukee, Wis. 53202.

Wharves.–Milwaukee has numerous wharves, piers, and docks in the outer harbor and in the Milwaukee, Menomonee, and Kinnickinnic Rivers. Only the deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 47, published and sold by the U.S.

Structures across Milwaukee, Menomonee, and Kinnickinnic Rivers (Continued)

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
	South Menomonee Canal							
29	South Sixth St. bridge	Highway	1.51			77	30	Bascule. Note 1.
30	North-South Freeway (I-94) bridge	Highway	1.75			140	100	Fixed.
	Burnham Canal							
31	Chicago, Milwaukee, St. Paul & Pacific RR bridge	Railroad	1.74		65		8	Swing. Note 1.
32	North-South Freeway (I-94) bridge	Highway	1.79			95	80	Fixed.
33	South Eleventh St. bridge	Highway	1.96	46	45		7	Swing. Note 1.
	Kinnickinnic River							
34	Chicago & North Western Ry. bridge	Railroad	1.19	61	61		8	Swing. Note 1.
35	Kinnickinnic Ave. bridge	Highway	1.63			100	10	Bascule. Note 1.
36	Chicago, Milwaukee, St. Paul & Pacific RR bridge	Railroad	1.67	93			15	Swing. Note 1.
37	Chicago & North Western Ry. bridge	Railroad	1.71	93			15	Swing. Note 1.
38	South First St. bridge	Highway	1.78			70	14	Bascule. Note 1.
39	Overhead cables	Power	2.00				30	
40	Becher St. bridge	Highway	2.02			50	12	Fixed.
41	Overhead cable		2.09					Data not available.
42	Overhead cable		2.11					Data not available.
43	Lincoln Ave. bridge	Highway	2.30				10	Fixed. Head of navigation.

Note 1.–See 33 CFR 117.1 through 117.59 and 117.1093, chapter 2, for drawbridge regulations.
Note 2.–The minimum vertical clearance at the channel limits is 96 feet.
Note 3.–Clear height is design clearance for 40-foot midwidth.
Note 4.–Vertical clearance is 16 feet at N edge of the channel decreasing to 10 feet at the S edge.

Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) Special cargo handling equipment is described with the individual facility. Cranes to 220 tons are available in the harbor. All the facilities have highway connections and some have railway connections. Water and electrical shore-power connections are available at some of the facilities.

Caution.–Vessels moored in the outer harbor may be subject to severe surging when there are strong NNE to ENE winds. During periods of adverse weather, the Coast Guard recommends that vessels moored in the outer harbor be adequately manned at all times to maintain mooring lines and/or safely get underway.

Facilities in the outer harbor:

Municipal General Cargo Terminal No. 1 Pier: 0.2 mile S of the river mouth; 520-foot E face, 23 to 26 feet alongside; 950-foot S face, 25 to 27 feet alongside; deck height, 11 feet; 19,000 square feet covered storage; 12,000 square feet open storage; receipt of salt; owned by Port of Milwaukee, and operated by Domtar Industries.

Municipal South Pier No. 1, North Side Open Dock: 0.3 mile S of the river mouth; 945-foot face; 25 to 27 feet alongside; deck height, 11 feet; 30-ton gantry crane; tank storage for 200,000 barrels; receipt and shipment of conventional and containerized general cargo, dry bulk commodities, steel products, and scrap metals; receipt of petroleum products and liquid chemicals; owned by Port of Milwaukee and operated by Meehan Seaway Service, Ltd, and Product Terminaling of Wisconsin, Inc.

Municipal South Pier No. 1, General Cargo Terminal No. 2: 0.35 mile 8 of the river mouth; 330-foot E face, 25 feet alongside; 978-foot S face, 26 to 27 feet alongside; deck height, 11 feet; use of cranes from South Municipal Bulk Cargo Wharf; 33,000 square feet covered storage; tank storage for 200,000 barrels; receipt and shipment of general cargo, dry bulk commodities, steel products, and scrap metals; receipt of petroleum products and liquid chemicals; owned by Port of Milwaukee and operated by Meehan Seaway Service, Ltd., and Product Terminaling of Wisconsin, Inc.

Municipal South Pier No. 2, General Cargo Terminals Nos. 3, 4, and 4A: 0.45 mile S of the river mouth; 945-foot N face, 25 to 30 feet alongside; 545-foot E face, 26 to 28 feet alongside; 1,005-foot S face, 26 to 29 feet alongside; deck height, 12 feet; use of cranes from South Municipal Bulk Cargo Wharf; 69,000 square feet covered storage; 180,000 cubic feet cold storage; 1.6 acres open storage plus container storage area; receipt and shipment of general and containerized cargo, steel products, dry bulk commodities, and scrap metal; owned by Port of Milwaukee and operated by Meehan Seaway Service, Ltd.

Municipal Liquid Cargo Pier: 0.8 mile S of the river mouth; 1,066-foot N face, 20 to 27 feet alongside; 1,088-foot S face, 20 to 27 feet alongside; deck height, 11 feet; storage tanks for 2 million gallons of vegetable oils and 248,000 barrels of petroleum products; receipt and shipment of vegetable oils, tallow, and animal fats; receipt of petroleum products and liquid fertilizer; owned by Port of Milwaukee, and operated by Milwaukee Liquid Lakes Terminal, Inc. and Tanco Terminals, Inc.

Facilities in the Kinnickinnic River:

Municipal Heavy Lift Dock: E side of the Kinnickinnic River 0.35 mile above the mouth; 1,659-foot W face; 22 to 28 feet alongside; 160-foot N face; 14 to 25 feet alongside; deck height, 6 feet; cranes to 220 tons; 5 acres open storage; receipt and shipment of general and containerized general cargo and heavy lift commodities, dry bulk commodities, steel products, and scrap metal; owned by Port of Milwaukee and operated by Meehan Seaway Service, Ltd.

North Municipal Bulk Cargo Wharf: outer end of E side of Municipal Mooring Basin; 1,270-foot face; 21 to 25 feet alongside; deck height, 6 feet; open storage for 200,000 tons of salt; receipt of salt; owned by Port of of Milwaukee, and operated by Domtar Industries, Inc.

South Municipal Bulk Cargo Wharf: inner end of E side of Municipal Mooring Basin; 1,930-foot face; 19 to 25 feet alongside; deck height, 7½ feet; cranes to 96 tons; open storage for 72,000 tons of salt; receipt of bulk salt; owned by Port of Milwaukee, and operated by International Salt Co., Edward E. Gillen Co., and Advance Boiler and Tank Co.

Municipal West Open Dock: inner end of W side of Municipal Mooring Basin; 992-foot face, 504 feet of berthing space alongside permanently moored storage vessel; 27 feet alongside; deck height, 6 and 8 feet; cranes to 50 tons with magnets on storage vessel; receipt of pig iron and shipment of scrap metal; owned by Port of Milwaukee and operated by Miller Compressing Co.

Kinnickinnic Elevator Wharf, Continental Grain Elevator: outer end of W side of Municipal Mooring Basin; 1,490-foot face; 27 to 28 feet alongside; deck heights, 6 and 9 feet; 3¼-million-bushel grain elevator; one marine leg, unloading rate 12,000 bushels per hour; 6 vessel-loading spouts, loading rate 9,000 bushels per hour each; receipt and shipment of grain; owned by Chicago and North Western Transportation Co. and operated by Continental Grain Co.

Medusa Cement Co. Dock: E side of river below Kinnickinnic Avenue bridge; 550-foot face; 17 to 21 feet alongside; deck height, 5 feet; storage silos for 260,000 tons of cement; receipt of bulk cement; owned and operated by Medusa Cement Co.

Wisconsin Wrecking Co. Wharf: W side of the river above Chicago and North Western Transportation Co. bridge; 670-foot face; 22 feet alongside; deck height, 7 feet; 8 acres of open storage; receipt and shipment of crushed stone; owned and operated by Wisconsin Wrecking Co.

Greenfield Avenue Terminal Wharf: W side of the river, about 0.25 mile below the Chicago and North Western Transportation Co. bridge; 826-foot face, 27 feet alongside; deck height, 5 feet; 13.8 acres of open storage; receipt and shipment of dry bulk materials; owned and operated by Port of Milwaukee.

Schwerman Trucking Co., East Washington Street Wharf: S side of slip on W side of river 0.35 mile above the mouth, and N side of the slip just S; 723-foot N face, 27 feet alongside; 1,103-foot S face, 6 to 18 feet alongside; deck height, 4 feet; storage tanks for 432,000 barrels; receipt and shipment of petroleum products; owned by Schwerman Trucking Co. and operated by Schwerman Distribution Center, Inc.

Afram Bros. Co., South Water Street Dock: N side of the slip on W side of river 0.35 mile above the mouth, and the riverfront adjacent downstream; 600-foot S face, 12 to 27 feet alongside; 710 feet of berthing space along river, 20 to 24 feet alongside; deck height, 5½ to 6 feet; cranes to 50 tons; 10 acres open storage; shipment and receipt of scrap metal; owned and operated by Afram Bros. Co.

Facilities in the Milwaukee River:

P and V Atlas Terminal Corp., Water Street Terminal Wharf: W side of the river just above junction with Kinnickinnic River; 630-foot face; 16 to 21 feet alongside; deck height, 10 feet; 51,000 square feet covered storage; receipt of newsprint; owned and operated by P and V Atlas Terminal Corp.

Facilities in the Menomonee River:

St. Mary's Wisconsin Cement, Milwaukee Terminal Dock: S side of the river 0.1 mile above North Sixth Street bridge; 600-foot face; 17 to 25 feet alongside; deck height, 6 feet; open storage for 20,000 tons of cement clinker; silo storage for 22,000 tons of cement; receipt of cement clinker; owned and operated by St. Mary's Wisconsin Cement, Inc., Division of St. Mary's Cement, Ltd.

Wisconsin Electric Power Co., Valley Plant Canal Street Coal Dock: S side of the river 0.2 mile above North-South Freeway (I-94) bridge; 500-foot face; 18 to 21 feet alongside; deck height, 6 feet; open storage for 30,000 tons of coal; occasional receipt of coal; owned and operated by Wisconsin Electric Power Co.

Schwerman Trucking Co., 17th Street Wharf: N side of the river above the Sixteenth Street bridge; 3,000-foot face; 14 to 19 feet alongside; deck height, 4 feet; open storage for 80,000 tons of salt; storage tanks for 1,000,000 gallons; receipt of salt, stone, and liquid chemicals; owned by Schwerman Trucking Co. and operated by Schwerman Distribution Center, Inc. and Milwaukee Solvents and Chemical Corp.

Facilities in South Menomonee Canal:

Lake Shore Sand Milwaukee Plant Dock: W side of the mouth of the canal; 331 feet of berthing space; 12 to 18 feet alongside; deck height, 6 feet; open storage for 80,000 tons of sand; receipt of sand; owned and operated by Lake Shore Sand, Division of Construction Aggregates Corp. of Michigan.

Morton Salt, Milwaukee Plant Dock: N side of canal immediately above Lake Shore Sand Dock; 478-foot face; 14 feet alongside; deck height, 3 to 5 feet; covered storage for 4,000 tons of salt; open storage for 40,000 tons of salt; receipt of salt; owned and operated by Morton Salt Division, Morton Thiokol, Inc.

Wisconsin Electric Power Co., Valley Plant Main Coal Dock: N side of the canal above North-South Freeway bridge; 575-foot face; 18 to 21 feet alongside; deck height, 7½ feet; open storage for 250,000 tons of coal; receipt of coal; owned and operated by Wisconsin Electric Power Co.

Schneider Fuel and Supply Co., Canal Street Dock: N side just below the head of the canal; 290-foot face; 17 feet alongside; deck height, 3 to 4 feet; open storage for 30,000 tons of coal; receipt of coal; owned by Schneider Fuel and Supply Co. and operated by Wisconsin Electric Power Co.

Cargill Elevator E Wharf: S side just below the head of the canal; 910-foot face; 21 feet alongside; deck height, 6 to 6½ feet; 2½-million-bushel grain elevator; one marine leg, unloading rate 7,000 bushels per hour; two loading spouts, combined rate 26,000 bushels per hour; receipt and shipment of grain; owned and operated by Cargill, Inc.

Facilities in Burnham Canal:

Huron Cement, Milwaukee Terminal Wharf: N side of the canal below South Eleventh Street bridge; 400-foot face; 19 to 21 feet alongside; deck height, 3 feet; silo storage for 18,000 tons of cement; receipt of bulk cement; owned by Huron Cement, Division of National Gypsum Co. and operated by Huron Cement and J.M.S. Towing Services, Inc.

Dundee Cement Co., Milwaukee Terminal Wharf: S side of the canal above South Eleventh Street bridge; 319-foot face; 16 to 18 feet alongside; deck height, 4 feet; silo storage for 10,000 tons of cement; receipt of bulk cement; owned and operated by Dundee Cement Co.

Supplies.–All types of marine supplies and provisions are available in Milwaukee. Bunker fuel and diesel oil are available by truck to facilities on Jones Island. Water is available at all the municipal docks and at some of the private facilities.

Foreign-Trade Zone No. 41 and Subzones Nos. 41A and 41B are in Milwaukee. (See chapter 1, Foreign-Trade Zones, and appendix for addresses.)

Repairs.–There are no facilities for drydocking deep-draft vessels at Milwaukee. Two companies on the E side of the Municipal Mooring Basin perform above-the-waterline and major engine repairs. Another company maintains portable equipment for making above-the-waterline repairs to vessels at their berths.

Small-craft facilities.–S of the outer harbor, a series of breakwaters parallels the SW shore of Milwaukee Bay for about 2 miles. The basin thus formed provides good anchorage for small-craft, and gasoline and diesel fuel are available at the yacht club at the N end. The basin may be entered from the S end of the outer harbor, marked by a light, or through a breakwater gap marked by a lighted buoy about 0.7 mile S of the outer harbor. The open S end of the basin and the small breakwater gap 0.45 mile NW should not be used without local knowledge.

The municipal marina at the N end of the outer harbor provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and launching ramps. A marina on the W side of the mouth of Kinnickinnic River provides gasoline, diesel fuel, sewage pump-out, and marine supplies. A 60-ton stiff-leg crane is available for complete hull and engine repairs. A repair yard on the E side of Kinnickinnic River 1.1 miles above the mouth has a 20-ton hoist and makes hull and small engine repairs.

Ferries.–A ferry crosses the Kinnickinnic River at the NW end of Jones Island. A ferry that carries automobiles and railroad cars operates between Milwaukee and Ludington from a terminal on the W side of Jones Island about 0.5 mile SW of South Pierhead Light.

Communications.–Milwaukee has excellent highway and rail freight connections. General Mitchell Field at the S end of the city provides freight and passenger air service.

North Point, about 3 miles N of the entrance to Milwaukee Harbor, is the N point of Milwaukee Bay. **North Point Light** (43°03.9'N., 87°52.3'W.), 154 feet above the water, is shown from a white octagonal tower with a red roof on the point.

Caution.–A small arms firing range is on the lakefront about 1,800 feet NE of North Point Light. Daily firing creates a caution zone extending 1,200 feet SE into Lake Michigan. The zone is 1,200 feet wide at its outer end and 500 feet wide at the shoreline. Guards are posted to signal cease firing when necessary, but mariners are advised to consult Local Notices to Mariners for schedules of firing and instructions.

Chart 14904.–Whitefish Bay is a slight recession in the shoreline between North Point and **Fox Point,** 6.5 miles N. The shoal border around the bay is about 0.7 mile wide. Submerged net stakes extend about 0.9 mile from shore.

From Fox Point N for 15 miles to Port Washington, the shore is a steep bluff about 100 feet high. Shoals extend 0.5 to 1 mile offshore. A wreck, covered 1 foot, is 0.6 mile offshore 3.3 miles N of Fox Point. A bell tower, reported to resemble a spire, is prominent about 6 miles N of Fox Point.

Port Washington, Wis., is an artificial harbor about 25 miles N of Milwaukee Harbor. **Sauk Creek,** a very small stream, enters the S side of the harbor at the inner end of the coal wharf.

Prominent features.–Prominent are the powerplant stacks on the S side of the harbor and spires NW of the inner end of the N breakwater.

Port Washington Breakwater Light (43°23.2'N., 87°51.7'W.), 78 feet above the water, is shown from a white square tower on a concrete base on the outer end of the N breakwater; a fog signal is at the light.

Channels.–A dredged entrance channel leads from deep water in Lake Michigan to an outer basin protected on the N by a breakwater and on the S by a breakwater and coal wharf. The outer ends of the breakwaters are marked by lights and the NE corner of the coal wharf is marked by a private light. From the W end of the outer basin, the channel leads to two inner basins. In 1979, the controlling depths were 20 feet from deep water in the lake through the outer basin except for depths of 18 feet in the W 800 feet and shoaling to 17 feet along the edges, thence 12 feet in the W inner basin and 15 feet in the N inner basin. Between the S limit of the outer basin and the coal pier, depths were 19 feet to within 20 feet of the pier face.

The intake channel of the Wisconsin Electric Power Co. is 1,200 feet SW of the harbor entrance. The S side of the channel is protected by a jetty, marked on the outer end by a private light. An overhead power cable with unknown clearance crosses the mouth of the channel.

Caution.–Power company cooling water is discharged into the harbor in the vicinity of Sauk Creek and creates a very dangerous current across the entrance to the W inner basin. Extreme caution should be exercised when maneuvering in this vicinity. With 30 minutes advance notice of vessel arrival in the harbor, the Wisconsin Electric Power Co. will reduce cooling water discharge at the request of the vessel master and will make arrangements to handle lines when entering or leaving harbor. The power company can be contacted via the marine operator or by telephone, 414–284–5161, 24 hours a day.

In April 1983, a dangerous wreck was reported about 0.4 mile, 335° from Port Washington Breakwater Light in 43°23'27.4"N., 87°51'46.6"W.

Harbor regulations.–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

Wharves.–Wisconsin Electric Power Co. receives coal at the 1,175-foot wharf on the S side of the outer basin. The wharf has a reported controlling depth of 22 feet alongside and a deck height of 13 feet. A bucket unloader operates at 600 tons per hour from vessels to a 600,000-ton coal storage area.

Murphy Oil Co. receives gasoline and heating oil at a 300-foot wharf on the W side of the N inner basin. The wharf has a reported controlling depth of 18 feet alongside and deck height of 10 feet. There is tank storage for 180,000 barrels.

Small-craft facilities.–A small-craft basin, protected by breakwaters, is in the NW corner of the outer basin. The outer ends of the breakwaters are marked by lights. Transient berths, gasoline, water, and electricity are available on the N side of the W inner basin. Launching ramps are in the N end of the outer basin. A sewage pump-out facility is in the N inner basin.

Charts 14904, 14903.–From Port Washington for about 26 miles NNE to Sheboygan, the shore is bold. Shoals extend about 0.6 mile offshore, and numerous net stakes are within 2 miles of shore. A wreck, covered 26 feet, is 0.9 mile from shore 8.2 miles NNE of Port Washington. A sunken caisson, covered 16 feet, is 0.6 mile offshore 8 miles SSW of Sheboygan. Tanks at Belgium, Cedar Grove, and Oostburg, Wis., are prominent.

Charts 14903, 14922.–Sheboygan, Wis., is a port city about 51 miles N of Milwaukee Harbor at the mouth of the **Sheboygan River.**

Sheboygan Breakwater Light (43°45.0'N., 87°41.6'W.), 55 feet above the water, is shown from a red cylindrical tower on the outer end of the breakwater on the N side of the entrance channel; a fog signal is at the light.

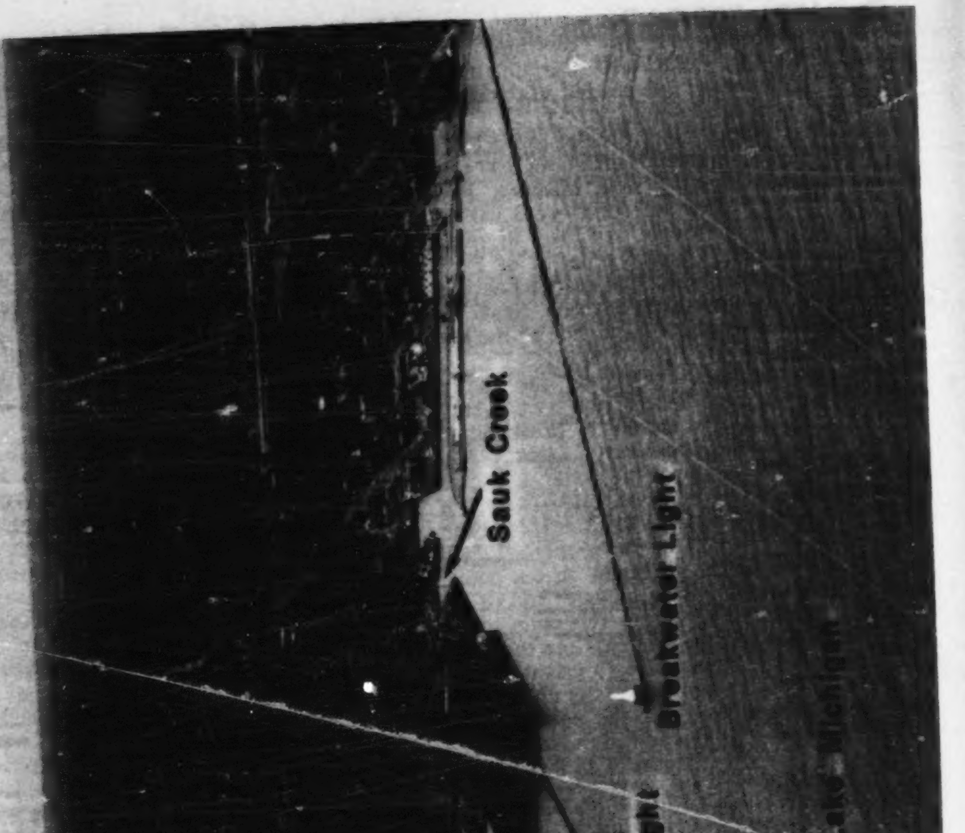
Caution.–A Sheboygan Police Department firing zone is about 2 miles S of the S pier at Sheboygan Harbor. The firing area is 3,500 feet wide and extends about 3 miles lakeward. Firing is conducted from 0600 to 2100 7 days a week, year round; red flags are displayed while firing is in progress. Extreme caution is advised.

Channels.–A dredged entrance channel leads NW from deep water in Lake Michigan between a breakwater on the N and a pier on the S to an outer harbor turning basin. The outer ends of the breakwater and pier are marked by lights. The channel leads across the S side of the basin to the mouth of Sheboygan River and thence upstream for about 1 mile. The N side of the river mouth is marked by a light. A radiobeacon is near the **Coast Guard station** in 43°45.0'N., 87°42.2'W.

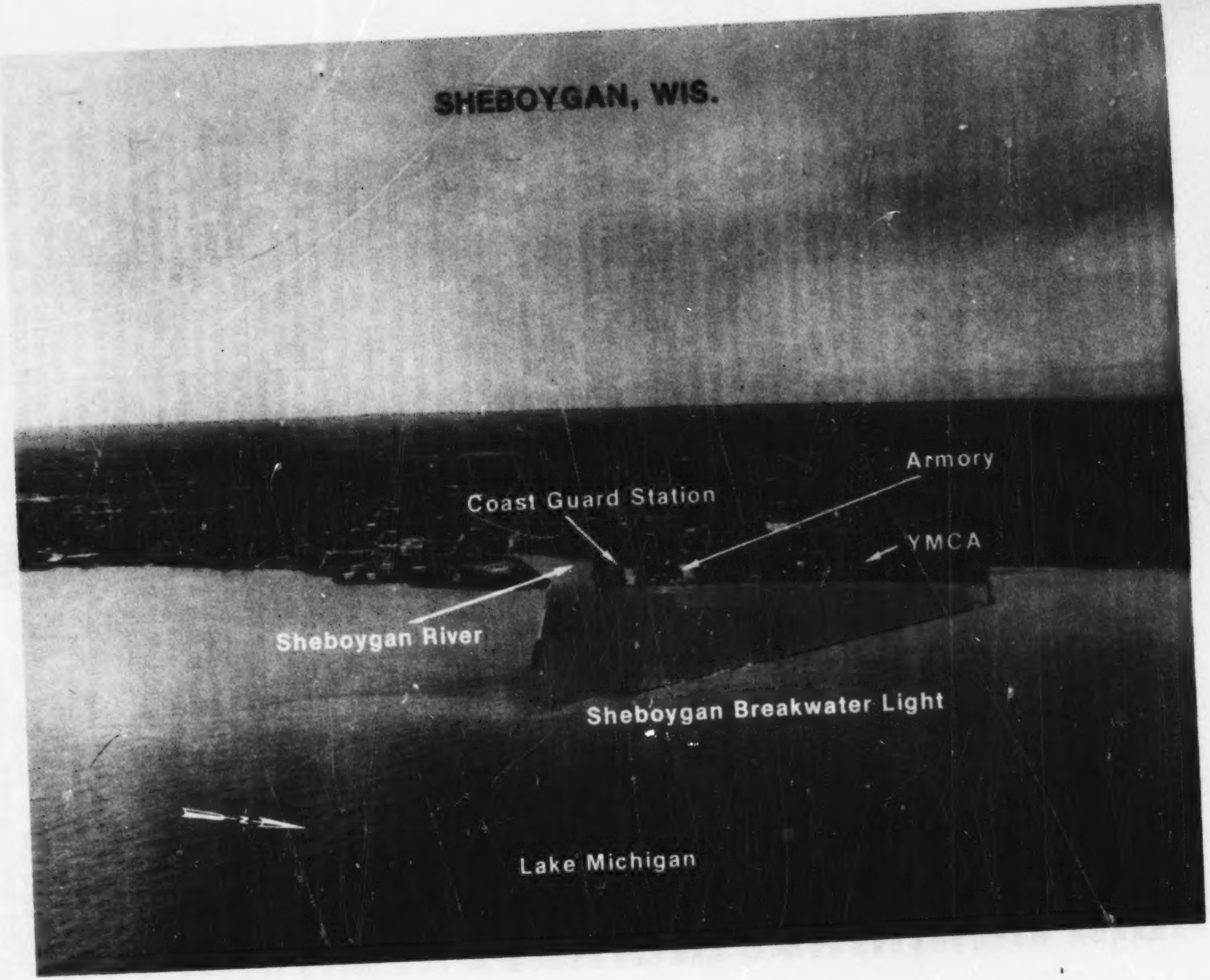
In May 1982, the controlling depths were 17 feet through the entrance channel to the outer basin, thence 15 feet in the outer basin, except for shoaling along the S edge and in the NW corner, thence 10 feet (13 feet at midchannel) from the mouth of the river to the Eighth Street bridge, thence 6 feet at midchannel to the head of the project at Jefferson Street.

The entrance channel is subject to shoaling caused by the drift of sand from the S.

PORT WASHINGTON, WIS.



SHEBOYGAN, WIS.



Currents in the river attain velocities up to 3 mph.

The outer basin is not adapted for anchorage, but greatly reduces wave action in the lower river. Mooring to the breakwater or piers is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Bridge regulations.–All watercraft navigating the Sheboygan River and harbor or other navigable waters connected herewith within the limits of the city of Sheboygan, when passing any bridge in said city, shall move or be moved past the same as expeditiously as is consistent with the proper use of the river by other watercraft; but in no case shall any watercraft, while passing through any bridge, remain or obstruct the passageway more than 5 minutes, and no watercraft shall be so anchored or fastened as to prevent any bridge from a free and speedy opening. Any master or other person having charge of any watercraft, who shall violate any provisions in this section, shall forfeit and pay for each offense a penalty of not less than $5 nor more than $25.

Time allowed for opening bridge.–Whenever any person having charge of any watercraft shall wish to move the same past any bridge, reasonable time shall be allowed for the opening of the same; and any person who shall move any watercraft against any bridge, or the center or protection pier thereof, before the same shall be opened, to the injury thereof, shall forfeit and pay for each offense a penalty of not less than $5 nor more than $50, and shall likewise be liable to the city of Sheboygan for all damages done to the bridge and center or protection piers thereof.

Towage.–Tugs are available from Milwaukee and Sturgeon Bay. (See Towage under those ports.)

Sheboygan is a **customs port of entry.**

Sheboygan Coast Guard Station is on the N side of the mouth of Sheboygan River. **Storm warning signals are displayed.** (See charts.)

Harbor regulations.–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120**, chapter 2, for regulations.)

Local harbor regulations are enforced by the **harbormaster** who can be reached through the Department of Public Works, City Hall, Sheboygan, Wis. 53081. A **speed limit** of 4 mph (3.5 knots) is enforced within the harbor limits. Copies of the regulations may be obtained from the harbormaster.

Wharf.–Reiss Coal Co. receives coal at their wharf on the S side of the river, from the mouth upstream to the Eighth Street bridge. There is a total of 3,120 feet of berthing space; the longest face is 1,330 feet long. The reported controlling depth alongside is 19 to 20 feet, and the deck height is 7½ to 8 feet. There is storage for 1½ million tons of coal. Continental Oil Co. receives oil and alcohol by barge at the W end of the wharf.

Small-craft facilities.–Marinas in the Sheboygan River provide transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and limited marine supplies. Hoists can handle 35-foot boats for engine and minor hull repairs.

From Sheboygan, the shore is a moderate bluff for 24 miles NNE to Manitowoc. The shoal border in this stretch is up to 1.4 miles wide and has scattered rocks and boulders covered 8 to 12 feet near the outer edge. **Sheboygan Reef,** with depths of 4 to 18 feet and marked on the E side by a buoy, is 0.6 mile N of Sheboygan Breakwater Light. A dangerous boulder, covered 2 feet, is 0.7 mile offshore 9.6 miles N of Sheboygan. A dangerous submerged rock is 1

Structures across Sheboygan River

**Miles above North Pierhead Light*

***Clear width in feet proceeding upstream*

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
1	Eighth St. bridge	Highway	0.69			99	10	Bascule. Note 1.
2	Overhead cable		0.77					Data not available.
3	Overhead cable	Power	0.87				141	
4	Pennsylvania Ave. bridge	Highway	1.14			38	19	Fixed.
5	Overhead cable		1.22					Note 2.
6	Overhead cable		1.56					Data not available.
7	Chicago & North Western Ry. bridge	Railroad	1.57	60	60		20	Fixed.
8	Overhead cable		1.64					Data not available.
9	Fourteenth St. bridge	Highway	1.65			54	14	Fixed.
10	Chicago & North Western Ry. bridge	Railroad	2.29					Fixed. Data not available.
11	Overhead cable		2.30					Data not available.
12	Overhead cable		2.35					Data not available.
13	New Jersey Ave. bridge	Highway	2.36					Fixed. Data not available.

Note 1.-See **33 CFR 117.1 through 117.59 and 117.1097**, chapter 2, for drawbridge regulations.

Note 2.-Cable extends from W side of the river to an island at midchannel.

mile offshore at the village of Northeim, Wis., 17 miles N of Sheboygan.

Chart 14903.–Caution.–The Sheboygan Rifle and Pistol Club, Inc., conducts firing daily on the lakefront about 5.5 miles N of the entrance to Sheboygan harbor. This firing creates a caution zone about 3,500 feet wide extending 3 miles lakeward from the shoreline. Mariners are advised to consult Local Notices to Mariners for schedules of firing and instructions.

Cleveland, Wis., formerly **Hika,** is 11.5 miles N of Sheboygan. In 1978, only a natural ramp and a small pier with shallow water alongside were available for boats at Cleveland.

Pilings that bare are about 275 yards offshore in about 43°59.6'N., 87°41.5'W. Caution should be exercised in the area.

Charts 14903, 14922.–Manitowoc, Wis., is a port city at the mouth of **Manitowoc River,** about 75 miles N of Milwaukee Harbor. The most prominent feature at Manitowoc is the lighted elevator 0.6 mile SW of Manitowoc Breakwater Light. The lighted stack 0.5 mile S of the elevator has horizontal red and white bands.

Manitowoc Breakwater Light (44°05.6'N., 87°38.6'W.), 52 feet above the water, is shown from a white cylindrical building on the outer end of the N breakwater; a fog signal and a radiobeacon are at the light.

Channels.–A dredged entrance channel leads from deep water in Lake Michigan between converging breakwaters through an outer harbor basin to the mouth of the Manitowoc River, and thence upstream for about 1.6 miles to the second Soo Line Railroad bridge. The outer ends of the breakwaters and the N side of the river mouth are marked by lights. In April 1983, the controlling depths were 19 feet through the entrance and outer basin, except for shoaling in the SE and NW corners, thence 14 feet (18 feet at midchannel) in the river channel to a point 150 feet below the second railway bridge, thence 10 feet to the limit of the project.

A small-boat basin, entered through an opening in the N breakwater, is about 0.25 mile above Manitowoc Breakwater Light. The E side of the entrance is protected by a short jetty, marked at its outer end by a light. The ends of the breakwater are marked by a light and a daybeacon. In November 1982, the controlling depth was 6 feet through the breakwater with 4 to 8 feet available in the basin except for shoaling to 3 feet along the W edge.

The river channel is quite winding and should be navigated with care. The river banks are generally hardpan and firm clay, quite stony in places.

Above the dredged channel, the river has depths of 6 feet in the NW half and 10 feet in the SE half to the Chicago and North Western Railway bridge except for a 5-foot shoal extending downstream from the center bridge pier, thence about 4 feet to the Twenty-first Street bridge, and thence about 3 feet to the third Soo Line Railroad bridge.

The outer basin is not adapted for anchorage, but reduces wave action in the lower section of the river. Mooring to the breakwaters is prohibited. Mariners are cautioned against navigating outside the channel limits in the vicinity of structures protected by stone riprap.

The currents in the river attain velocities up to 3 mph.

An irregularly shaped diked disposal area extends 1,700 feet N from the N side of the N breakwater.

Caution.–Manitowoc Shoal, on the S side of the approach to the harbor, has a least depth of 14 feet about 0.65 mile SE of Manitowoc Breakwater Light. The NE side of the shoal area is marked by a buoy. A shoal with a least depth of 14 feet is about 1.2 miles SE of the breakwater light.

Towage.–Tugs are available from Milwaukee, Sturgeon Bay, and Green Bay. (See Towage under those ports.)

Manitowoc is a **customs port of entry.**

Harbor regulations.–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

Local harbor regulations are under the control of the Harbor Commission and are enforced by the **harbormaster** who can be reached through the Board of Harbor Commissioners, City Hall, 817 Franklin Street, Manitowoc, Wis. 54220. Copies of the regulations can be obtained from the Board of Harbor Commissioners. A **speed limit** of 4 mph (3.5 knots) is enforced within the harbor limits.

Wharves.–Manitowoc has several deep-draft facilities along the Manitowoc River. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) The facilities described have highway connections and some have railway connections. Some of the facilities have water and electrical shore-power connections.

C. Reiss Coal Co. Dock: W side of the slip extending S at the river mouth; 900-foot face; 17 to 23 feet alongside; deck height, 8 feet; open storage for 175,000 tons of coal; receipt of coal; owned and operated by C. Reiss Coal Co.

Anheuser-Busch, Grain Dock: S side of the river 700 feet above the mouth; 190-foot face; 19 feet alongside; deck heights, 4 and 6 feet; silo storage for over 4 million bushels of grain; one marine leg, unloading rate 9,500 bushels per hour; one vessel-loading spout, loading rate 12,500 bushels per hour; receipt of grain; owned and operated by Anheuser-Busch, Inc.

The Manitowoc Co., Berths A and B: W side of the river 0.15 mile above the first Soo Line Railroad bridge; Berth A, 450-foot face, 21 feet alongside; Berth B, 680-foot face, 16 to 18 feet alongside; deck height, 3½ feet; shipment of heavy machinery; owned and operated by The Manitowoc Co., Inc.

The Manitowoc Co., Berths C and D: W side of the river 0.3 mile above the first Soo Line Railroad

Structures across Manitowoc River

**Miles above the mouth of the river*

***Clear width in feet proceeding upstream*

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
1	Eighth St. bridge	Highway	0.29			86	12	Bascule. Notes 1 and 3.
2	Tenth St. bridge	Highway	0.43			85	15	Bascule. Note 1.
3	Soo Line RR bridge	Railroad	0.91			93	6	Bascule. Notes 1 and 2.
4	Soo Line RR bridge	Railroad	1.60	61	61		6	Hand-operated swing. Seldom opened.
5	Chicago & North Western Ry. bridge	Railroad	1.75	60	60		11	Fixed.
6	Overhead cable	Power	1.76				84	
7	Overhead cable	Power	1.86				64	
8	Overhead cables	Power	1.95				84	
9	Twenty-first St. bridge	Highway	1.97			107	16	Fixed.
10	Overhead cables		2.02					Data not available.
11	Overhead cable		2.30					Data not available.
12	Soo Line RR bridge	Railroad	2.33	45	45		11	Fixed. Head of navigation.

Note 1.–See 33 CFR 117.1 through 117.59 and 117.1089, chapter 2, for drawbridge regulations.

Note 2.–No bridgetender is on duty on Saturdays or Sundays and from 2000 to 0400 on weekdays from about December 15 to March 15 annually. Bridge will be opened on 2-hour advance notice; from 0630 to 1530 telephone the telegraph operator, 648–6861, and at all other times call the Soo Line section foreman, 414–722–4228.

Note 3.–The bridge is skewed in relation to the axis of the channel. Total available horizontal clearance, 90 feet.

bridge; Berth C, 260-foot face, 14 to 16 feet alongside; Berth D, 360-foot face, 14 to 16 feet alongside; deck height, 3½ feet; 75-ton stiff-leg derrick; shipment of heavy-lift items; owned and operated by The Manitowoc Co., Inc.

Medusa Cement Co. Wharf: NW side of the river at the upper end of the dredged channel; 1,200-foot face; 20 feet alongside; deck height, 6 feet; silo storage for 53,000 tons of cement; receipt of bulk cement; owned and operated by Medusa Cement Co.

Small-craft facilities.–Gasoline, sewage pump-out facilities, and a launching ramp are available on the N side of the river mouth.

Ferries.–Ferries that carry passengers, autos, and railroad cars operate from the E side of the slip at the river mouth to Ludington, Mich., and from the N side of the river 0.5 mile above the mouth to Frankfort. Mich.

Supplies and repairs.–Large vessels do not normally bunker or take on supplies at Manitowoc. Bunker oil can be supplied by tank truck. Emergency above-the-waterline repairs are available.

Chart 14903.–The shore trends 5.7 miles NE from Manitowoc to Two Rivers. A shoal with a least depth of 8 feet and marked on the SE side by a buoy is 1 mile NE of Manitowoc Breakwater Light. Otherwise, the 18-foot contour is within 0.5 mile of shore in this stretch. Net stakes extend about 1.5 miles from shore.

Two Rivers, Wis., is a town and harbor at the mouth of the **Twin Rivers,** about 80 miles N of Milwaukee Harbor. The harbor is used mainly by local fish tugs and recreational craft.

Prominent features.–Prominent are two white tanks with black tops 3,100 feet WNW of the harbor entrance, a stack 650 feet NE of the tanks, a spire 1,700 feet NE of the tanks, and a lighted silver tank with "Twin Rivers" in black letters 0.9 mile NNE of the harbor entrance.

Channels.–A dredged entrance channel leads NW from deep water in Lake Michigan between parallel piers to a harbor basin at the confluence of **East Twin River** and **West Twin River** and thence upstream in East Twin River for about 0.5 mile to the 22nd Street bridge. The outer ends of the piers are marked by lights and the rivers are partially marked by private buoys; the buoys are unnumbered and are shifted to mark the best water. In April 1985, the midchannel controlling depths were 12 feet in the approach channel, thence 11 feet at midchannel between the piers, thence 18 feet in the basin except for minor shoaling along the SW edge; thence in the East Twin River 7 feet (10 feet at midchannel) to the head of the project. The entrance channel is subject to shoaling, especially during the winter and after severe storms.

A small basin at the shoreward end of the N pier is not used by vessels, but reduces wave action in the inner harbor. The inner basin is not adapted for anchorage, and mooring to the piers and revetments is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Currents in the river attain velocities up to 3 mph.

West Twin River has depths of about 9 feet in the

S part of the channel from the basin to Washington Street bridge. The nominal head of navigation on the East and West Twin Rivers is 3 and 7 miles, respectively, from the mouth, the navigable depth being not over 4 feet. Only small recreational craft operate on these rivers above the dredged channels.

Bridge regulations.–(a) Notice to Open Bridges Required. The operator of any boat desiring to pass through any bridge in the city of Two Rivers shall notify the city of his intention to pass through such bridge, and the city employees shall be allowed a reasonable time thereafter to open such bridge.

(b) Bridges on West Twin River. To avoid traffic congestion, the bridges on the West Twin River shall not be opened between 6:30 a.m. and 7:00 a.m., 7:30 a.m. and 8:00 a.m., 11:55 a.m. and 1:00 p.m., 3:30 p.m. and 4:15 p.m. and 4:45 and 5:15 p.m. on any day except Saturday, Sunday, and holidays when they may be opened at anytime.

Request to open bridges should be given to the Two Rivers Police Department, telephone 414–793–1155, via land telephone or marine operator.

Two Rivers Coast Guard Station is on the NE side of the entrance channel. **Storm warning signals are displayed.** (See chart.)

Harbor regulations.–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120**, chapter 2, for regulations.)

Small-craft facilities.–A marina on the S side of the West Twin River provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 40-ton crane is available for engine and electronic repairs.

Rawley Point is a broad, rounding, wooded point NE of Two Rivers. **Rawley Point Light** (44°12.7'N., 87°30.5'W.), 113 feet above the water, is shown from a white cylindrical tower on the point, 5.3 miles NE of Two Rivers. A radiobeacon is at the light. Between Two Rivers and Rawley Point Light, shoals extend about 0.8 mile from shore. Net stakes reach over 2 miles from shore.

From Rawley Point Light the moderately bluff shore trends generally N for about 17 miles to Kewaunee. Rocky shallows extend about 1 mile from shore. A dangerous wreck that bares is about 1.5 miles north of Rawley Point Light in about 44°13.9'N., 87°30.2'W. Extreme caution should be exercised in the area. Point Beach Nuclear Power Plant, 5 miles N of Rawley Point Light, has a square green building prominent from offshore. Kewaunee Nuclear Power Plant is on **Observation Point,** 9 miles N of Rawley Point Light. The cooling tower at the plant is prominent.

Kewaunee Shoal is a hard gravel and boulder reef extending about 1.8 miles E from shore just S of the entrance to Kewaunee harbor. The shoal has a least depth of 13 feet near the outer end. **Kewaunee Shoal Light** (44°27.1'N., 87°27.9'W.), 45 feet above the water, is shown from a white skeleton tower with a square green daymark on the outer end of the shoal; a fog signal is at the light. Due to protective riprap, the light should not be passed close aboard, even by shallow-draft vessels.

Charts 14902, 14903, 14910.–Kewaunee, Wis., is a

Structures across East and West Twin Rivers

**Miles above North Pierhead Light*

***Clear width in feet proceeding upstream*

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above Low Water Datum*	*Remarks*
				Right	*Left*	*Center*		
	East Twin River							
1	17th St. bridge	Highway	0.48			70	14	Bascule.
2	22nd St. bridge	Highway	0.82			70	9	Bascule.
3	Overhead cable		1.22				25	
	West Twin River							
4	Washington St. bridge	Highway	0.53			55	14	Bascule.
5	Chicago & North Western Ry. bridge	Railroad	0.62	50	50		12	Swing.
6	Overhead cables	Power	0.62				95	
7	16th and Madison Sts. bridge	Highway	0.81			70	14	Bascule.
8	Overhead cable		0.91				37	

town and small-craft harbor at the mouth of **Kewaunee River**, about 102 miles N of Milwaukee Harbor and 25 miles S of the entrance to the Sturgeon Bay Ship Canal.

Kewaunee Pierhead Light (44°27.4'N., 87°29.6'W.), 45 feet above the water, is shown from a white square tower on the outer end of the pier on the S side of the harbor entrance; a fog signal and a radiobeacon are at the light.

Channels.–A dredged entrance channel leads from deep water in Lake Michigan NW to an outer harbor basin protected by a breakwater on the NE side and a pier on the S side. The outer ends of the breakwater and pier are marked by lights. From the outer basin, the channel leads between piers at the mouth of Kewaunee River to a turning basin inside the mouth, thence N inside the shoreline to the N harbor basin. The outer end of the pier on the N side of the river mouth is marked by a light.

In May 1985, the midchannel controlling depths were 17 feet in the approach channel, thence 17 feet through the S part of the outer basin, thence 12 feet (20 feet at midchannel) between the piers, thence 20 feet in the E half of the turning basin decreasing to 7 feet in the W half of the basin, thence 18 feet in the channel to the N basin except for shoaling to 13 feet along the W edge, thence 19 to 20 feet in the basin with lesser depths along the W edge, thence 19 to 20 feet in the basin with lesser depths along the sides. The N part of the outer basin has depths of 14 feet at the E end decreasing to 7 feet at the W end.

The outer basin is not adapted for anchorage, but reduces wave action in the inner harbor. Mooring to the breakwater or piers is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Currents in the river attain velocities up to 3 mph.

Above the turning basin, the Kewaunee River is navigable for about 6.5 miles by craft drawing not more than 4 feet.

Caution.–Kewaunee Shoal and a shoal with a least depth of 15 feet that extends 0.5 mile E from the outer end of the breakwater should be avoided in approaching the harbor.

Bridges.–A bascule highway bridge with a clearance of 9 feet crosses Kewaunee River about 0.3 mile above the mouth. Overhead power cables just below the bridge and 0.2 mile above the bridge have clearances of 46 and 28 feet, respectively. A Green Bay and Western Railroad bridge 1.5 miles above the river mouth has a swing span with two 30-foot openings and a clearance of 5 feet. (See **33 CFR 117.1 through 117.49**, chapter 2, for drawbridge regulations.)

Harbor regulations.–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120**, chapter 2, for regulations.)

Local harbor regulations have been established by the city of Kewaunee and are enforced by a **harbormaster**, usually found at the city launch ramps, and by the police department. A **speed limit** of 5 mph (4.3 knots) is enforced in the harbor. Copies of regulations can be had from the City Clerk, 413 Milwaukee Street, Kewaunee, Wis. 54216.

Small-craft facilities.–Transient berths, electricity, gasoline, diesel fuel, sewage pump-out, and engine repairs are available at the city dock on the W side of the turning basin. In 1978, depths of 6 feet were reported alongside. City launching ramps are on the N side of the river 600 feet NW of Park Street bridge.

Ferries.–Ferries that carry passengers, autos, and railroad cars operate from the NE side of the turning basin to Frankfort and Ludington, Mich.

From Kewaunee N for 11 miles to Algoma the shore is low bluffs decreasing in height at the N end of the reach. Shoals extend about 0.8 mile offshore. Boulders covered 11 to 12 feet are near the outer edge of the bank just N of Kewaunee. Detached 11- and 12-foot spots are from 0.2 to 0.5 mile S of the entrance to Algoma harbor.

Algoma, Wis., is a town and small-craft harbor at the mouth of the **Ahnapee River**, about 112 miles N of Milwaukee Harbor and 14 miles SSW of the entrance to the Sturgeon Bay Ship Canal. The harbor is used mainly by local fish tugs and recreational craft.

Prominent features.–Prominent are a silver tank 1 mile W of the harbor entrance, three black stacks 0.9 mile NW of the entrance, and a gray spire 0.4 mile N of the entrance.

Algoma Pierhead Light (44°36.4'N., 87°25.8'W.), 48 feet above the water, is shown from a red cylindrical tower on the outer end of the pier on the N side of the entrance channel; a fog signal is at the light.

Channels.–A dredged entrance channel leads from deep water in Lake Michigan between a N pier with a detached outer section and a S breakwater to an outer harbor basin, thence through the mouth of Ahnapee River upstream for 0.2 mile to the Second Street bridge. The outer ends of the breakwater, the detached pier, and the main pier section are marked by lights. In May 1985, the controlling depths were 13 feet in the entrance channel and 8 feet across the NE part of the outer basin, thence 3 feet (7 feet in the E half of the channel) upstream to the Second Street bridge except for shoaling to 1 foot along the SW side of the channel about 330 feet below the bridge. The outer basin, SW of the channel, had depths of 7 feet decreasing to 2½ feet at the SW limit.

The river channel bottom is rock and should be navigated with caution. Above the dredged channel, depths of about 3 feet can be carried for about 2 miles. The bottom in this reach is also rock.

The outer basin is not adapted for anchorage, and mooring to the breakwater or piers is prohibited. Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Currents in the river attain velocities up to 3 mph.

Bridges.–Second Street bridge, about 0.2 mile above the mouth of Ahnapee River, has a fixed span with a clearance of 11 feet. Fourth Street bridge, 0.4

mile above the river mouth, has a 42-foot fixed span with a clearance of 11 feet. Overhead cables just below and about 0.2 mile above the Fourth Street bridge have unknown clearances. An overhead power cable about 300 feet above the bridge has a clearance of 39 feet.

Harbor regulations.–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120**, chapter 2, for regulations.) Local harbor regulations have been established by the city of Algoma, and are enforced by a Water Safety Patrol. Copies of regulations may be obtained from the Chief of the Water Safety Patrol.

Small-craft facilities.–A marina on the NE side of the river just above the mouth provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and marine supplies. Hoists to 40 tons are available for complete hull, engine, and electronic repairs. In 1978, the reported controlling depth was 8 feet alongside the fuel dock.

From Algoma NNE for 14 miles to the entrance to the Sturgeon Bay Ship Canal, the shore is wooded and hilly, becoming lower in the N 4 miles. The shoal border varies in width from 0.5 to 1.3 miles. A buoy 2.2 miles S of the canal entrance marks the outer edge of the shoals.

Charts 14902, 14910, 14919.–Sturgeon Bay Ship Canal provides a navigable connection between Lake Michigan and the S end of Green Bay. A canal has been cut from Lake Michigan across a narrow strip of land to the head of **Sturgeon Bay**, and thence a dredged channel leads through Sturgeon Bay to Green Bay. The Lake Michigan entrance to the canal is about 126 miles N of Milwaukee Harbor, across the lake W of Frankfort, Mich.

Sturgeon Bay Ship Canal Light (44°47.7'N., 87°18.8'W.), 107 feet above the water, is shown from a white cylindrical tower on the N side of the canal entrance; a radiobeacon is at the light.

Channels.–The dredged channel from Lake Michigan to Green Bay is about 8.6 miles long. The channel leads NW from deep water in Lake Michigan through detached piers and converging breakwaters, thence through a revetted canal to the SE end of Sturgeon Bay and thence through Sturgeon Bay to the vicinity of Sherwood Point. A turning basin is on the SW side of the channel at the city of Sturgeon Bay. The outer ends of the piers are marked by lights, and the approach channel is marked by unlighted buoys 0.2 mile SE of the pierhead lights. A fog signal is at the N pierhead light. The dredged channels through the canal and Sturgeon Bay are well marked with lights, a lighted range, and lighted and unlighted buoys.

In 1983, the controlling depths were 20 feet (23 feet at midchannel) in the approach channel in Lake Michigan, thence 13 feet (17 feet at midchannel) between the breakwaters, thence 19 feet (22 feet at midchannel) through the revetted canal, thence 11 feet (18 feet at midchannel) through Sturgeon Bay, with 20 feet in the turning basin.

Currents in the canal and bay attain velocities up to 7 mph in either direction.

Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

The channels and basin are not adapted for anchorage of vessels; vessels entering the canal for shelter may moor at the W end of same.

Sturgeon Bay is a natural branch of Green Bay, but the navigational aids that mark the channel through it are placed with respect to proceeding from Lake Michigan through the ship canal to Green Bay.

Dangers.–A shoal with a least depth of 16 feet is 1.3 miles SE of the Lake Michigan entrance to the canal. A lighted buoy at the S end of the shoal marks the approach to the canal.

A solid rock ledge, covered 10 feet, borders the SW side of the dredged approach channel. Vessels entering the canal should avoid courses which will carry them close to this ledge and should enter the dredged approach channel between the unlighted buoys at its outer end.

Bridges.–An overhead power cable with a clearance of 140 feet crosses the canal 1.25 miles above the Lake Michigan entrance. Bayview Bridge, a bascule highway bridge with a clearance of 42 feet, crosses the canal 3 miles above the entrance. Michigan Street bridge at Sturgeon Bay has a bascule span with a clearance of 14 feet. (See **33 CFR 117.1 through 117.59 and 117.1101**, chapter 2, for drawbridge regulations.)

Sturgeon Bay Canal Coast Guard Station is on the N side of the Lake Michigan entrance. **Storm warning signals are displayed.** (See charts.)

A **speed limit** of 5 mph (4.3 knots) is enforced in the Sturgeon Bay Ship Canal. (See **33 CFR 162.125 and 207.470**, chapter 2, for navigation regulations.)

Sturgeon Bay, Wis., is a city on the Sturgeon Bay Ship Canal midway between Lake Michigan and Green Bay. The city is an important repair center, having facilities for repairs to all types and sizes of craft. Mooring for vessels is available at the municipal dock on the W side of the bay immediately SE of the Michigan Street bridge.

Anchorages.–Special anchorages are on the N side of the dredged channel at the Bayview Bridge and on the S side of the channel 0.8 mile W of the bridge. (See **33 CFR 110.1 and 110.78**, chapter 2, for limits and regulations.)

Towage.–Tugs to 1,600 hp are available at Sturgeon Bay from Selvick Marine Towing Corporation. Arrangements are made through their dispatch office in Sturgeon Bay at 414-743-6016. Tugs are also available from Green Bay. (See Towage under Green Bay.) The tugs' VHF-FM.

The Coast Guard maintains a **marine inspection office** at Sturgeon Bay. (See appendix for address.)

Repairs.–Bay Shipbuilding Corp. operates two graving docks and a floating drydock on the E side of Sturgeon Bay 0.7 mile N of the Michigan Street bridge. The largest graving dock is 1,150 feet long, 140 feet wide, and has 18 feet over the keel blocks.

The floating drydock can handle vessels to 640 feet long, 68 feet wide, and 7,150 tons. The 604-foot drydock is sectional and can be split up to any combination of 60-foot lengths.

Peterson Builders, Inc. operates a 374-foot floating drydock 0.25 mile SE of Michigan Street bridge. The drydock can handle vessels to 275 feet long, 35 feet wide, and 1,800 tons.

Small-craft facilities.–A marina 0.5 mile SSE of the Michigan Street bridge provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. Four mobile hoists to 50 tons can handle 60-foot craft for complete hull, engine, and electronic repairs. In 1978, depths of 5 to 9 feet were reported alongside the marina docks.

Just NW of the Michigan Street bridge, a narrow spit of land, the remains of a former railroad bridge, extends NE from shore to near the edge of the dredged channel. A buoy off the end of the spit marks the channel limit.

Dunlap Reef, marked on the NE side by a light, is on the W side of the dredged channel from about 0.3 to 0.7 mile NW of the Michigan Street bridge. The center of the reef bares. A buoy midlength of the E side of the reef marks the edge of the dredged channel. There is deep water to W of the reef, but only about 11 feet between the S end of the reef and the spit of land NW of the Michigan Street bridge.

Hills Point, marked by a light, is on the W side of Sturgeon Bay 2.2 miles NW of the Michigan Street bridge. **Sturgeon Bay Entrance Leading Light,** on shore 0.8 mile NW of Hills Point, shows on the centerline of the entrance channel to Sturgeon Bay from Green Bay.

Sawyer Harbor is a small shallow inlet on the W side just inside the mouth of Sturgeon Bay. A marina on the N side of the inlet provides transient berths, water, and electricity.

Sherwood Point is the N point of the spit of land that extends N and E from shore to form the W side of the entrance to Sturgeon Bay. **Sherwood Point Light** (44°53.6′N., 87°26.0′W.), 61 feet above the water, is shown from a white square tower with an attached dwelling on the point; a radiobeacon is at the light. A lighted bell buoy 1 mile E of Sherwood Point Light, near the middle of the mouth of Sturgeon Bay, marks the entrance to the Sturgeon Bay Ship Canal.

Sherwood Point Shoal, a detached shoal with a least depth of 11 feet, is marked on the N side by a lighted horn buoy 2 miles NW of Sherwood Point Light. The shoal is a hazard to vessels approaching Sturgeon Bay from S. A shoal bank with depths of 2 to 18 feet extends from shore SW of Sherwood Point to within 0.3 mile of the S side of Sherwood Point Shoal.

Chart 14902.–From the SE entrance to the Sturgeon Bay Ship Canal, the W shore of Lake Michigan trends NNE for 38 miles to the N tip of Door Peninsula, which separates the S end of Green Bay from Lake Michigan. This stretch is composed of a series of points with small bays between. The offshore areas are interspersed with submerged net stakes. The shore is low, sloping, and wooded.

Charts 14902, 14910.–**Whitefish Point** (44°52.5′N., 87°12.3′W.) is 7.7 miles NE of Sturgeon Bay Canal Light. A shoal with a least depth of 10 feet, marked at the outer end by a buoy, extends 1 mile SE from the point.

Whitefish Bay is a bight between Whitefish Point and **Cave Point,** 4 miles NNE. From the Sturgeon Bay Ship Canal NNE to Cave Point, the shoal border varies in width from 0.3 to 1 mile. A detached rock ledge, covered 16 feet, is off the mouth of Whitefish Bay, 1.8 miles S of Cave Point.

Jacksonport, Wis., a small village 3.4 miles N of Cave Point, is used by only a few recreational craft. There is a launching ramp at the State park.

A shoal with a least depth of 3 feet extends 1.8 miles SE from shore just N of Jacksonport and is marked at the outer end by a gong buoy. A detached bank with depths of 13 to 17 feet is about 1 mile offshore 3.7 miles NE of Jacksonport.

Charts 14902, 14909.–**Baileys Harbor,** about 14 miles N of Whitefish Point, is a small bay protected on the E by a point that extends E, then S, from shore. Shoals that extend 1 mile S from the point are marked on the SW side by a buoy. A shoal with a least depth of 1 foot that extends from shore on the W side of the harbor entrance is marked at the NE end by a buoy. Shoals extend about 0.25 mile off the E shore of the harbor and 0.5 mile off the N and W shores. **Baileys Harbor Directional Light** (45°04.2′N., 87°07.1′W.), at the NW corner of the harbor, shows a **339° to 340½°** white sector which marks the best water into the harbor. Vessels approaching Baileys Harbor should keep 1.5 miles offshore until the white sector is visible. A lighted bell buoy 3 miles SSE of the light, in the white sector, marks the harbor entrance.

Baileys Harbor is sheltered and affords good anchorage, but is subject to considerable surge during heavy seas. Vessels should not anchor nearer than 0.5 mile of the N shore of the harbor, as the water is shallow and the sea that sets in during S gales is only partially broken by the shoals outside. The best holding ground is on the E side of the harbor.

A yacht club on the NE side of Baileys Harbor provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and a launching ramp. Emergency repairs are available.

Moonlight Bay opens on the NE side of the point which forms the E side of Baileys Harbor. The bay has deep water to just inside the entrance and affords fairly good anchorage with protection from all but E to S winds.

Cana Island Light (45°05.3′N., 87°02.8′W.), 83 feet above the water, is shown from a white conical tower on a small island connected to shore by a narrow neck 1.5 miles NE of Moonlight Bay. From the light N to North Bay, the shore is clear except for numerous submerged net stakes extending about 0.7 mile offshore.

North Bay, 3 miles N of Cana Island Light, has a small area of deep water near its mouth and affords fair anchorage for small craft with protection from all but E winds. Entrance to the bay is constricted by shoals that extend off each entrance point. The shoals are marked at the ends by buoys. Vessels should take care to avoid abandoned net stakes in the entrance.

From the point that encloses the E side of the North Bay, the shore extends N to Rowley Bay, enclosed on the E by a point on which is located Newport State Park. **Rowley Bay** affords only limited shelter, and the anchorage is not good. The N end of the bay is fouled by many rocky spots covered 2 to 14 feet.

The approach to Rowley Bay is obstructed by numerous shoals. **Four Foot Shoal,** 3 miles long N and S, lies with its N end 1.4 miles S of the point which encloses the E side of the bay. A bank with numerous rocks awash is on the S end of the shoal, and the N end of the shoal has limiting depths of 2 to 6 feet. Buoys mark the SE and W sides of the shoal. A shoal with rocks awash near the inner end and a depth of 11 feet near the outer end extends 1.1 miles S from Newport State Park and is marked by a buoy at the outer end. A detached shoal, marked on the S side by a buoy, has 2- and 9-foot spots 1 mile SW of Newport State Park. A shoal with a least depth of 1 foot extends from shore W of the N end of Four Foot Shoal and is marked at the outer end by a buoy. Rowley Bay may be entered W of Four Foot Shoal, between it and the shore to W. This passage is obstructed by a detached 9-foot shoal W of the midpoint of Four Foot Shoal. The bay may also be entered N of Four Foot Shoal.

Sand Bay is a small indentation on the W side of Rowley Bay 1.4 miles S of the head. Slips on the W side of the bay used by commercial fishermen are protected by breakwalls and provide shelter in all winds. The slips have depths of about 6 feet. A resort marina on the W side of the bay provides berths, electricity, gasoline, and sewage pump-out.

The waters from Rowley Bay N to Porte des Morts Passage are rendered foul by an irregular bottom with shallow banks and detached spots. **Spider Island** is a heavily wooded island 0.6 mile SE of Newport State Park with very shallow spots between. A shoal with a least depth of 9 feet, marked on the S side by a buoy, is 0.7 mile SE of Spider Island. **Outer Shoal,** marked on the E side by a buoy, is the outermost part of the foul area and lies 2.5 miles NE of Spider Island. A 4-foot spot is 0.5 mile W of the buoy, and detached spots covered 6 to 18 feet are within 1.3 miles SW of the buoy.

Waverly Shoal and Nine Foot Shoal are on the NE and SE corners, respectively, of an offshore bank E of the N end of Door Peninsula and on the S side of Porte des Morts Passage. **Waverly Shoal,** with a least depth of 12 feet and marked on the NE end by a lighted bell buoy, is 5.2 miles N of Spider Island. **Nine Foot Shoal,** just S of Waverly Shoal, has a least depth of 4 feet and is marked on the E side by a buoy.

The N shore of Door Peninsula is deep-to through Porte des Morts Passage into Green Bay.

Charts 14902, 14908, 14909, 14910.–Green Bay is 118 miles long NE and SW, from the head of Big Bay de Noc to the mouth of Fox River, and has a maximum width of 23 miles. The bay is separated from Lake Michigan by two mainland peninsulas; **Garden Peninsula,** the N one, is 20 miles long, and **Door Peninsula,** the S one, is about 70 miles long. The entrance to Green Bay between the peninsulas is about 28 miles wide, but is so congested with islands and shoals that the passages between them have acquired the reputation of being dangerous. The main entrances are through Porte des Morts Passage, Rock Island Passage, St. Martin Island Passage, and Poverty Island Passage.

Charts 14902, 14909.–Porte des Morts Passage, the S entrance to Green Bay, is known as **Death's Door,** due to the numerous detached shoals which obstruct it and the strong currents which set in or out of the passage according to the wind direction. The shores are rockbound and almost certain destruction to vessels going aground. These conditions have been the cause of many vessel disasters. The passage is bordered on the N side by Plum Island and Pilot Island and on the S side by Waverly Shoal and Door Peninsula.

The entrance to Porte des Morts Passage from Lake Michigan is marked by a **330°30'** lighted range on the SW shore of Plum Island. A radiobeacon is at the rear range light. The approach to the passage is marked by a lighted bell buoy on the range line 5.4 miles SSE of Plum Island.

Plum Island, about 1 mile long and 0.7 mile wide, is about midway between Door Peninsula and Washington Island, the largest island in the entrance to Green Bay. Shoals extend about 0.3 mile off the W and E sides of the island. Detached 16- and 19-foot spots are about 0.6 mile E of the S end of the island. A shoal with a least depth of 1 foot extends N from the island and is marked on the E side by a lighted buoy 0.6 mile N of the island. The buoy can be passed close aboard on the E side, but a narrow ridge of 15- to 20-foot depths extends 0.4 mile N from the buoy. Anchorage on the E side of Plum Island, between it and Detroit Island, is safe and is occasionally used in E gales, but it is subject to considerable swell. **Plum Island Coast Guard Station,** seasonally operated, is on the N side of the island.

Pilot Island, 1.7 miles SE of Plum Island, is on the NE side of the Lake Michigan entrance to Porte des Morts Passage. Shoals extend 0.3 mile SE and SW from the island. **Pilot Island Light** (45°17.1'N., 86°55.2'W.), 48 feet above the water, is shown from a square yellow tower, with a red roof, attached to a dwelling on the island.

Detroit Island, 3.5 miles long, extends SE from the SW end of Washington Island. The NE side of the island is connected to the S side of Washington

Island by a very shallow rocky bank. The width of this bank diminishes toward the SE end of Detroit Island, where the bank extends 0.5 mile SE and S.

Detroit Island Passage leads between the SW end of Washington Island and Detroit Island on the NE and Plum Island on the SW. The passage is obstructed by several shoals off the SW side of Detroit Island. The most dangerous is a 3-foot spot marked on its SW side by a buoy near the middle of the passage. Vessels should not pass NE of the buoy without local knowledge. There is good water between the buoy and the shoals off Plum Island. A shoal bank with depths of 8 to 10 feet parallels the SW side of Detroit Island about 0.8 mile offshore.

Washington Island, the largest in the entrance to Green Bay, is a wooded island about 5.5 miles square. The W and N shores of the island are bluff with deep water close-to. The NW point of the island is marked by a light. The E side of the island is bordered by a shoal bank with a greatest extent of 1.25 miles and depths of 9 to 12 feet at the outer edge. **Hog Island** is a small island on the widest part of the bank. A detached 9-foot spot is 0.6 mile SE of the SE point of the Washington Island.

Detroit Harbor is a large, but shallow indentation in the S shore of Washington Island. The mouth of the harbor is protected by the N end of Detroit Island. A semicircular bight in the N end of Detroit Island forms a well protected area in the S part of the harbor. N of Detroit Island, the harbor has general depths of 7 to 10 feet and a rocky spot, covered 3 feet, near the center. Shallow-draft vessels with local knowledge may enter the harbor across the rocky bank which connects the NE side of Detroit Island to Washington Island. The main entrance to the harbor is W of Detroit Island.

Channels.–A dredged entrance channel leads N from deep water in Detroit Island Passage between Washington Island and the W side of Detroit Island for 0.7 mile to a turning basin in the SW corner of Detroit Harbor. In 1979, the midchannel controlling depth was 13 feet in the channel with 8½ to 14 feet in the basin. A light with a fog signal marks the W side of the channel entrance, and a lighted and several unlighted buoys mark the channel and basin.

Small-craft facilities.–Transient berths, gasoline, diesel fuel, water, ice, and electricity are available on the W side of the basin. A boatyard on the E side of Detroit Harbor provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and some marine supplies. An 8-ton mobile hoist and a 65-ton marine railway that can handle 65-foot craft are available for hull and engine repairs.

Ferry.–An automobile and passenger ferry operates from the W side of the basin to Gills Rock, on the N end of Door Peninsula.

Figenscaus Harbor (West Harbor) is a small shallow indentation in the W shore of Washington Island. Its shoal water and exposure to W and NW winds make it practically of no value for commercial purposes.

Washington Harbor is a deep indentation in the N shore near the NW corner of Washington Island. The harbor has good water with bold shores, and although the bottom is ledge rock and poor holding ground for anchors, good protection is afforded from all but N winds.

Jackson Harbor is a small shallow indentation in the NE corner of Washington Island. Immediately inside of the entrance, a small area about 250 feet by 200 feet in size has depths of 10 to 12 feet. A considerable part of the remainder of the harbor is from 8 to 6 feet deep.

Channels.–A channel, marked on the W side by a light and on the E side by a buoy, leads from Green Bay across the bar at the mouth of the harbor to the deeper water inside. In 1979, the controlling depth was 3½ feet (7½ feet at midchannel). A shoal with a depth of 2 feet extends NE from the entrance buoy.

Route.–It is reported that Jackson Harbor should be entered by approaching on a course of about **210°** tangent to the NW point of Rock Island, passing about 40 feet off Jackson Harbor Light, thence turning S to pass between the light and the buoy marking the E side of the entrance. Favor the buoy side of the channel, and when the buoy comes abeam, turn SW and make for the E dock.

Limited transient berths are available at Jackson Harbor.

Ferry.–An automobile and passenger ferry operates from Jackson Harbor to Rock Island, just NE.

Rock Island is a State park connected close NE of Washington Island by a shallow rocky bank. The W, N, and E sides of the island are bluff with deep water close-to. A light on the NW corner of the island marks the S side of Rock Island Passage. The light is obscured from **200°** to **095°** by the dense foliage on Rock Island. Ferries operate from the State park pier on the SW side of the island to Jackson Harbor and Gills Rock on Door Peninsula.

Fish Island is a small island on a rocky bank 2.2 miles SE of Rock Island. The bank extends about 0.8 mile N and S from the island. **Fisherman Shoal,** 1.5 miles SSW of Fish Island, is about 1.3 miles long NW and SE and has several spots awash. The SE end of the shoal is marked by a lighted bell buoy. Both Fish Island and Fisherman Shoal are hazards to vessels navigating Rock Island Passage. A deep channel is between these banks and Washington and Rock Islands.

Rock Island Passage, the widest passage into Green Bay, leads between Fish Island and Rock Island on the S and St. Martin Island Shoals on the N. A lighted gong buoy 3.4 miles ENE of Rock Island marks the Lake Michigan entrance to the passage. The course from the buoy into Green Bay is **270°.**

The **State boundary** between Wisconsin and Michigan passes through Rock Island Passage.

St. Martin Island is a wooded and hilly island 4.5 miles NNE of Rock Island. The W, N, and E shores of the island are generally deep-to. A shoal with depths of 3 to 19 feet extends 1.4 miles S from the SE point of the island.

St. Martin Island Shoals are detached spots from about 1.5 to 2.3 miles S of St. Martin Island. The shoalest spot, covered 7 feet, is 2 miles S of the island with an 8-foot spot close N. From the 7-foot spot, the shoal extends 0.4 mile SW with depths increasing to 20 feet and is marked at the outer end by a buoy. A detached 13-foot shoal 0.7 mile E of the 7-foot spot is marked on the SE side by a buoy.

St. Martin Island Light (45°30.2'N., 86°45.5'W.), 84 feet above the water, is shown from a white hexagonal tower on the NE point of St. Martin Island and marks the W side of St. Martin Island Passage. A fog signal and a radiobeacon are at the light.

Gull Island and **Little Gull Island** are on the N and S ends, respectively, of a shoal bank 1.7 miles E of the N end of St. Martin Island. Between the islands, the bank has depths of 2 to 3 feet. **Gravelly Island,** on the continuation of the bank N of Gull Island, is surrounded by very shallow water. A channel with a depth of about 17 feet leads E and W between Gull and Gravelly Islands. A buoy 0.6 mile SW of Gravelly Island marks the W side of the bank. **Gravelly Island Shoals** comprise three detached shoals N of the island; a 14-foot spot 0.4 mile N, a 13-foot spot 0.7 mile N, and an 18-foot spot 1.2 miles N. These shoals are a hazard to vessels transiting Poverty Island Passage.

St. Martin Island Passage leads between Gravelly and the Gull Islands on the E and St. Martin Island on the W. A lighted bell buoy about 0.4 mile S of Little Gull Island marks the Lake Michigan entrance to the passage. From a point about 0.6 mile S of the buoy, the course through the passage is **319°**.

Poverty Island, 2.6 miles ENE of Gull Island, is marked on the S end by an abandoned lighthouse. The W side of the island, fronting Poverty Island Passage, is deep-to. A shoal extends 0.4 mile E from the S end of the island, and a shoal bank connects the NE side of the island with Summer Island, 1 mile NE. **Poverty Island Light** (45°31.4'N., 86°40.0'W.), 80 feet above the water, is shown from a conical tower on the SW side of the island.

Poverty Island Shoal, 1.8 miles NW of Poverty Island, extends 1 mile N and S and has a least depth of 13 feet.

Poverty Island Passage leads between Poverty Island and Poverty Island Shoal on the NE and the Gull Islands, Gravelly Island, and Gravelly Island Shoals on the SW. In addition to Poverty Island Shoal and Gravelly Island Shoals, the passage is also obstructed by a detached 20-foot spot 1 mile NE of Gravelly Island. Vessels bound for Green Bay should pass about 0.75 miles S of Poverty Island and then shape their course to pass between Poverty Island Shoal and Gravelly Island Shoals. The passage should only be navigated by light-draft vessels.

Charts 14902, 14908, 14909.–Summer Island and **Little Summer Island,** the northernmost islands in the mouth of Green Bay, are 2 miles S and 3 miles W, respectively, of **Point Detour,** the S tip of Garden Peninsula which encloses the N end of Green Bay. The islands are connected by a sandy and stony flat which also reaches NE to the mainland. There are numerous rocks awash in this area. Depths over the flat are 1 to 3 feet between the islands and 5 feet between the islands and the mainland except for a narrow 6-foot channel that closely follows the shore. This channel is obstructed by a 1-foot spot marked on the NW side by a buoy. Shoals extend 1 mile W from Little Summer Island. **Rocky Island** and several small bare spots are on this bank. **Little Summer Island Shoal,** with a least depth of 6 feet, is 1 mile SW of Little Summer Island. A shoal bank with depths of 10 to 19 feet connects the S end of Summer Island to Poverty Island. The deeper water is close to Poverty Island. Summer Island is marked on the NE side by a light.

Charts 14902, 14909.–From Porte des Morts Passage, the W shore of Door Peninsula extends generally SSW for 34 miles to the mouth of Sturgeon Bay. **Hedgehog Harbor,** a deepwater bight at the N end of the peninsula, is enclosed on the E by **Table Bluff** and on the W by **Deathdoor Bluff.** The harbor is well sheltered from S winds. **Gills Rock, Wis.,** a small village on the SE side of the harbor, is the terminous for passenger and automobile ferries operating to Detroit Harbor and Rock Island. A detached 15-foot shoal is 0.3 mile N of Deathdoor Bluff.

Ellison Bluff, 3.5 miles SSW of Deathdoor Bluff, encloses the W side of **Ellison Bay.** The bay opens to the NW and provides protection from S and E winds. Good holding ground is in the S part of the bay in depths of 15 to 40 feet. **Ellison Bay, Wis.,** is a village at the head of the bay. Berths, gasoline, water, ice, and launching ramps are available.

From Ellison Bluff, the bluff shore extends 4.7 miles S to the head of Sister Bay. There is deep water close-to, except for a 15-foot shoal extending 0.5 mile from shore about 2.5 miles S of Ellison Bluff. **Sister Bay,** enclosed on the W by **Sister Bluffs,** provides good anchorage with protection from ENE to W winds, mud and sand bottom. **Sister Bay, Wis.,** a village at the head of the bay, has a marina which provides complete small-craft services. Craft to 38 feet can be hauled out for hull and engine repairs.

The waters NW of the mouth of Sister Bay are obstructed by several shoals and small islands. **Sister Islands,** two small islands on a shallow bank, are 2.5 miles NNW of the head of Sister Bay. The bank, which extends 0.2 mile N and 0.6 mile S from the islands, is marked on the W side by a buoy. A detached shoal with least depths of 12 feet is 1.2 miles S of the Sister Islands. **Sister Shoals** comprise a group of detached shoals from 0.6 to 1.5 miles N of the W end of Sister Bluffs. The shoals, with a least depth of 1 foot at the N end, are marked on the W side by a buoy. **Horseshoe Reefs,** 3 miles NW of Sister Bluffs, extend 2.6 miles NE and SW. These rocky reefs have a least depth of 1 foot and are marked on the SE side by a lighted buoy.

Eagle Harbor is a bay extending 2 miles S into the shoreline between Sister Bluffs on the E and Eagle Bluff on the W. The harbor has deep water within 0.8 mile of its head, except for detached 16- and 17-

foot spots in the center. The outer part of the harbor affords good anchorage with protection from all but N and NW winds. **Ephraim, Wis.,** a village on the SE side of the harbor, has small-craft facilities providing gasoline, diesel fuel, water, ice, and engine repairs.

Eagle Bluff, forming the W side of the mouth of Eagle Harbor, is marked by a prominent observation tower. **Nicolet Bay (Shanty Bay)** is a small bight opening just W of the tower. **Eagle Bluff Light** marks the W side of the point that encloses the W side of Nicolet Bay. The light is obscured from **210°** to **030°** by trees. **Horseshoe Island,** off the mouth of Nicolet Bay, is marked on the SW side by a light.

From Eagle Bluff Light, the shore is bluff for 2.7 miles S to Fish Creek. The **Strawberry Islands** are a group of four small islands on a shoal bank which parallels this stretch about 1 mile offshore, from about 2.5 miles SW to 1 mile NW of Eagle Bluff Light. The SW edge of the shoal bank is marked by a buoy. **Strawberry Channel,** leading between the island group and the mainland, is marked on the E by Eagle Bluff Light and on the W by a lighted bell buoy and a buoy which mark the SE and NE edges of the shoal bank, respectively. The narrowest part of the channel, abreast the lighted bell buoy, has a depth of 13 feet. The buoy should be passed close aboard to avoid a shoal that extends from the shore.

Chambers Island, 3.5 miles W of the Strawberry Islands, is in the middle of Green Bay. Shoals that extend about 1.9 miles N from the NE point of the island are marked on the outer end by a lighted bell buoy. A shoal with depths of 12 to 16 feet that extends 1.4 miles W from W side of the island is marked at the outer end by a lighted bell buoy. Shoals extend 0.7 mile off the SW shore of the island and 1.5 miles off the E shore. An 8-foot spot is on the outer edge of the shoals off the E shore. **Hanover Shoal,** with depths of 1 to 5 feet, extends 2 miles SE from the SE point of the island and is marked at the outer end by a buoy. Strangers should not attempt passage between Hanover Shoal and the Strawberry Islands. **Chambers Island Light** (45°12.1'N., 87°21.9'W.), 97 feet above the water, is shown from a white tower with a red and white diamond-shaped daymark on the NW side of the island. The light is a guide to the passage between the island and the W shore of Green Bay.

Fish Creek, Wis., is a village on the SW side of **Fish Creek Harbor** 2.7 miles S of Eagle Bluff Light. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and engine repairs are available. A **special anchorage** is in the bight. (See **110.79c,** chapter 2, for limits and regulations.)

From Fish Creek Harbor S for about 6 miles to Egg Harbor the shore is bluff and deep-to. **Hat Island** is 2.8 miles offshore at about the middle of this stretch. Shoals extend 0.4 mile SE from the island. A detached 14-foot shoal is 1.3 miles NE of the island, and a rock awash, marked on the E side by a buoy, is 0.7 mile S. A lighted buoy 1.5 miles E of Hat Island marks the S entrance to Strawberry Channel.

Egg Harbor, 8 miles S of Eagle Bluff Light, is a deep indentation open to the NW. The harbor affords good anchorage with protection from all but NW to N winds, mud bottom. **Egg Harbor, Wis.,** a village on the SE side of the bay, has a public dock with transient berths, electricity, gasoline, sewage pump-out, and a launching ramp.

Charts 14902, 14909, 14910.–From Egg Harbor, the shore is deep-to for 1.5 miles SW to **Leroys Point.** From Leroys Point for the stretch of 5 miles SW, to a point 3 miles SW of **Horseshoe Point,** the shore is bordered by shoals and numerous detached spots with depths of 6 to 10 feet within 1 mile of shore. **Monument Shoal,** near the S end of this stretch, is marked on the W side by a buoy. A 7-foot shoal is 1 mile S of the buoy. The shore in this stretch should be given a berth of 2 miles.

Charts 14902, 14910, 14918, 14919.–The shore from Monument Shoal SSW for 6 miles to the mouth of Sturgeon Bay is clear except for a 17-foot spot 0.6 mile offshore 3 miles N of the bay.

Sturgeon Bay (described with the Sturgeon Bay Ship Canal) extends about 8 miles SE from Green Bay.

Caution.–Aids to navigation in Sturgeon Bay have been placed with respect to traversing the bay from Lake Michigan through the Sturgeon Bay Ship Canal to Green Bay.

Sherwood Point Light (44°53.6'N., 87°26.0'W.), 61 feet above the water, is shown from a white square tower with attached dwelling on the SW side of the entrance to Sturgeon Bay.

From Sherwood Point Light the shore trends SW for 4 miles to a narrow peninsula that extends 1.2 miles NW from shore. **Snake Island** is close off the end of the peninsula. From the NE side of the peninsula and Snake Island, a shoal bank with depths of 2 to 18 feet extends 3.5 miles NNE. **Sherwood Point Shoal,** a detached 11-foot shoal marked on the N side by a lighted horn buoy, is off the N end of this shoal bank and 1.9 miles NNW of Sherwood Point. These shoals are a hazard to vessels navigating between Sturgeon Bay and the S end of Green Bay and should be given a wide berth.

High-Cliff Park is a small privately maintained artificial harbor 1.5 miles SW of Sherwood Point Light. The W side of the harbor entrance is protected by a breakwater. In 1978, the reported controlling depths were 4 feet in the entrance channel and harbor. Due to obstructions in the entrance, the harbor should not be entered without local knowledge.

A small bay on the S side of Snake Island has depths of 15 feet or more in the center and shoals toward shore. A privately dredged canal cuts across the W point of the bay to Little Sturgeon Bay.

Little Sturgeon Bay opens to the N about 6 miles SW of the mouth of Sturgeon Bay. The bay has central depths of 7 to 15 feet with shoals along the shores. The shoals on the W side of the bay are marked by buoys. An inn on the W side of the bay has transient berths with water and electricity.

From Little Sturgeon Bay SW for about 7 miles, the shore is generally deep-to, thence for 16 miles SW to the village of **Red Banks, Wis.**, the shoal border is 0.25 to 1 mile wide. A detached 10-foot shoal is 1.5 miles offshore 3.5 miles N of Red Banks. The S end of Green Bay, from Red Banks to the mouth of Fox River, has depths of 18 feet and less. From **Point Sable** (44°34.7'N., 87°54.7'W.), 3 miles SW of Red Banks, **Frying Pan Shoal**, with 1-foot depths and spots awash extends W across the Bay to Long Tail Point. A dredged deep-draft channel leads through the shoals at the S end of Green Bay to the mouth of Fox River.

Charts 14910, 14916, 14918.–Green Bay Harbor, at the mouth of **Fox River** at the S end of Green Bay, serves the cities of **Green Bay, Wis.**, and **De Pere, Wis.** The major commodities handled at the port are coal, limestone, wood pulp, cement, aggregates, and agricultural products.

Prominent features.–The most prominent objects in the approach to Green Bay are a tank 4 miles ESE of the mouth of Fox River, a lighted stack 1.1 miles S of the river mouth, a stack 2.1 miles NW of the river mouth, and a tank 3.5 miles NW of the river mouth at the town of Howard.

Green Bay Harbor Entrance Light (44°39.2'N., 87°54.1'W.), 72 feet above the water, is shown from a white conical tower on a cylindrical base on the W side of the entrance channel 9.3 miles NE of the mouth of Fox River. A fog signal and a radiobeacon are at the light.

Channels.–The dredged entrance channel leads generally SW through the shallow water in the S end of Green Bay for about 11.5 miles to the mouth of Fox River and thence upstream for about 7.2 miles to a turning basin at De Pere. Other turning basins are on the E side of the channel 1.4 miles above the mouth at the mouth of East River and on the W side of the channel 3.6 miles above the mouth just above the Chicago & North Western Railway bridge. The entrance channel is well marked by lights and lighted and unlighted buoys. The river channel is marked by buoys from the second turning basin to the turning basin at De Pere.

In 1982-November 1984, the controlling depth was 23 feet for a midwidth of 300 feet to about 800 feet below Light 22, thence 19 feet for a midwidth of 200 feet to the entrance to Fox River, thence 20 feet for a midwidth of 150 feet to the Main Street bridge with 24 to 14 feet in the East River turning basin, thence 20 feet for a midwidth of 150 feet to the Chicago and North Western Railway bridge with 20 to 15 feet in the turning basin just above the bridge, thence in 1982, the controlling depth was 5½ feet to the turning basin at De Pere, thence in 1977, 11 feet was available in the N part of the basin decreasing to less than 1 foot in the S part. **Mariners are advised to contact the Port Director, Port of Green Bay, for the latest controlling depths.**

East River empties into the E side of Fox River 1.3 miles above the mouth. The river is navigable to Baird Street bridge, 1.3 miles above the mouth. A depth of about 5 feet can be carried through the narrow and tortuous channel.

Caution.–Grassy Island, on the E side of the entrance channel 4 miles NE of the Fox River mouth, and **Cat Island,** on the W side of the channel opposite, partially cover during periodic high-water conditions. Grassy Island is marked on the NW end by a light.

In the approaches to Fox River, outside the limits of the dredged channel, numerous uncharted fish nets and stakes make navigation hazardous, particularly for strangers.

In 1978, a crescent-shaped diked disposal area was under construction about 1 mile E of the mouth of Fox River.

Fluctuations of water level.–Changes in wind direction or barometric pressure occasionally cause temporary water level fluctuations of up to 2½ feet above or below the prevailing mean lake level.

Currents.–Currents in Fox River attain velocities to 3 mph and may run in either direction.

Weather.–(See page T-13 for **Green Bay climatological table.**)

Towage.–Tugs to 1,200 hp are available at Green Bay. Arrangements are made through Selvick Marine Towing Corporation's dispatch office in Sturgeon Bay at 414-743-6016 or Great Lakes Towing Company's dispatch office in Cleveland at 800-321-3663.

Green Bay Coast Guard Station, seasonally operated, is on the E side of the mouth of Fox River.

Green Bay is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Harbor regulations.–Local harbor regulations are established by the City of Green Bay and enforced by the Port Director who can be reached at the Brown County Board of Harbor Commissioners, The Port of Green Bay, Wisconsin, Courthouse, Green Bay, Wis. 54301. Copies of the regulations can be obtained from the Port Director. A 4 mph (3.5 knots) **speed limit** is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

Local bridge regulations.–Section 1. (a) Except on Sundays and legal holidays, the draws of bridges will not be required to open from 7:00 a.m. to 8:00 a.m., from 12:00 noon to 1:00 p.m., and from 4:00 p.m. to 5:00 p.m.: Provided, that the draw shall be opened promptly at all times for the passage of vessels carrying United States mails, vessels belonging to the United States, vessels of 300 short tons or over cargo capacity engaged in commercial transportation and their attendant towing tugs, and tugs or fireboats when responding to emergency calls.

Sec. 2. No vessel, craft, or float shall approach or pass through any such bridge at a greater speed than 5 miles per hour.

Wharves.–Green Bay has numerous docks and wharves on both sides of the Fox River. Only the

Structures across Fox River below De Pere and East River

**Miles above the mouth of Fox River*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
	Fox River							
1	Overhead cable	Power	0.08				155	
2	Tower Drive bridge	Highway	0.41			402	120	Fixed. Note 4.
3	Overhead cable	Power	0.45				159	
4	Green Bay & Western RR and Chicago & North Western Ry. bridge	Railroad	1.03	85	85		7	Swing. Note 3.
	Junction with East River		1.21					
5	Main St. bridge	Highway	1.58			87	12	Bascule. Note 1.
6	Walnut St. bridge	Highway	1.81			78	9	
7	Overhead cable	Power	2.02				153	
8	Tilleman Memorial Bridge	Highway	2.27			124	32	Bascule. Note 1.
9	Chicago, Milwaukee, St. Paul & Pacific RR bridge	Railroad	2.61	75	75		8	Swing. Note 3.
10	Chicago & North Western Ry. bridge	Railroad	3.31	75	75		31	Swing. Note 3.
11	Allouez and Ashwaubenon bridge	Highway	5.02			150	60	Fixed.
	East River							
12	Overhead cable	Power	1.41				66	
13	Monroe Ave. bridge	Highway	1.56			60	13	Bascule. Note 2.
14	Chicago, Milwaukee, St. Paul & Pacific RR bridge	Railroad	1.60	60	60		6	Swing. Left draw not available. Note 3.
15	Overhead cable	Power	1.72				61	
16	Webster Ave. bridge	Highway	1.92			41	10	Fixed.
17	Chicago, Milwaukee, St. Paul & Pacific RR bridge	Railroad	2.21	60			7	Swing. Left draw not available. Note 3.
18	Main St. bridge	Highway	2.28			60	7	Fixed.
19	Baird St. bridge	Highway	2.66		40		10	Fixed.
20	Overhead cable	Power	3.31					Data not available.
21	Mason St. bridge	Highway	3.52			124	32	Bascule. Note 3.
22	Overhead cable	Power	3.64					Data not available.
23	Overhead cable	Power	4.71					Data not available.
24	Chicago & North Western Ry. bridge	Railroad	4.72				13	Fixed.

Note 1.–See **33 CFR 117.1 through 117.59 and 117.1087,** chapter 2, for drawbridge regulations.
Note 2.–See **33 CFR 117.1 through 117.59 and 117.1085,** chapter 2, for drawbridge regulations.
Note 3.–See **33 CFR 117.1 through 117.49,** chapter 2, for drawbridge regulations.
Note 4.–Vertical clearance at center of span.
Note 5.–In March 1985, construction in process to replace the bridge.

deep-draft facilities are described. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) Most of the facilities described have rail and highway connections. Water and electrical shore-power connections are available at several docks.

Facilities on the W side of Fox River:

Wisconsin Public Service Corp., Pulliam Power Plant Slip: N side of the slip 0.2 mile above the river mouth; 480 feet of berthing space between breasting dolphins; 19 feet alongside; deck height, 6½ feet; open storage for 600,000 tons of coal; receipt of coal;

bunkering of vessels; owned and operated by Wisconsin Public Service Corp.

Koch Fuels, North Dock: outer part of the N side of the slip 0.3 mile above the river mouth; 355-foot face; 18 feet alongside; deck height, 5 feet; pipeline extends to tank storage for 40,000 barrels; receipt of petroleum products; owned by F. Hurlbut Co. and operated by Koch Fuels, Inc.

Hurlbut North Dock: center part of the N side of the slip 0.3 mile above the river mouth; 745-foot face; 18 feet alongside; deck height, 5 feet; open storage for 50,000 tons of sand and limestone; receipt of limestone, sand, salt, coal, and petroleum coke; owned and operated by F. Hurlbut Co.

Hurlbut South Docks: two sections on S side of the slip 0.3 mile above the river mouth; 200- and 500-foot faces; 19 feet alongside; deck height, 5 feet; open storage for 200,000 tons of material; receipt of limestone, aggregate, salt, and coal; owned and operated by F. Hurlbut Co.

Koch Fuels, South Dock: center part of the S side of the slip 0.3 mile above the river mouth; 425-foot face; 19 feet alongside; deck height, 5 feet; tank storage for 55,000 barrels of asphalt and 55,000 barrels of bunker C; receipt of asphalt and bunker C; owned by F. Hurlbut Co. and operated by Koch Fuels, Inc.

Hurlbut Salt Dock: outer end of the S side of the slip 0.3 mile above the river mouth; 150-foot face, natural bank; 19 feet alongside; deck height, 4 feet; open storage for 100,000 tons of salt; receipt of salt; owned and operated by F. Hurlbut Co.

Amoco Oil Co. Dock: 0.8 mile above the river mouth; 355-foot face; 19 to 21 feet alongside; deck height, 5 feet; tank storage for 737,000 barrels; receipt and shipment of petroleum products; owned and operated by Standard Oil Division of Amoco Oil Co.

Anamax Corp. Wharf: 0.2 mile above Amoco Oil Co. Dock; 241-foot face; 23 feet alongside; deck height, 5 feet; tank storage for about 6,000 tons of tallow; shipment of liquid tallow; owned and operated by Anamax Corp.

Western Lime and Cement Co. Wharf: 0.25 mile above Anamax Corp. Wharf; 450-foot face; 23 feet alongside; deck height, 4 to 5 feet; open storage for 105,000 tons of limestone; receipt of limestone; owned and operated by Western Lime and Cement Co.

Leicht Transfer and Storage Co., North Dock No. 1: immediately above Western Lime and Cement Co. Wharf; 500-foot face; 22 to 25 feet alongside; deck height, 8 feet; cranes to 30 tons; 43,000 square feet covered storage; 30,000 square feet open storage; receipt and shipment of general cargo; owned and operated by Leicht Transfer and Storage Co.

Leicht Transfer and Storage Co., North Dock No. 2: immediately above Leicht Transfer and Storage Co., North Dock No. 1; 961 feet of berthing space; 24 to 28 feet alongside; deck height, 8 feet; cranes to 30 tons; 105,000 square feet covered storage; 52,000 square feet open storage; receipt and shipment of general cargo, pig iron, and miscellaneous bulk materials; owned and operated by Leicht Transfer and Storage Co.

Fort Howard Paper Co., Northern Coal Dock: 0.3 mile above Walnut Street bridge; 503-foot face; 24 feet alongside; deck height, 5 feet; open storage for 140,000 tons of material; receipt of salt and coal; owned and operated by Fort Howard Paper Co.

The C. Reiss Coal Co. Wharf: immediately above Tilleman Memorial (Mason Street) Bridge; 1,592-foot face; 18 to 23 feet alongside; deck height, 7 feet; open storage for 580,000 tons of coal; bridge crane with unloading rate 700 tons per hour; receipt of coal, pig iron, salt, and miscellaneous bulk materials; coal and oil bunkering; owned and operated by C. Reiss Coal Co.

Huron Cement Wharf: N side of the slip 0.65 mile above Tilleman Memorial Bridge; 426 feet of berthing space with dolphins; 19 feet alongside; deck height 8½ feet; storage silos for 15,000 tons of cement; receipt of bulk cement; owned and operated by Huron Cement Division of National Gypsum Co.

Leicht Transfer and Storage Co., State Street Dock: N side of the slip 0.2 mile above Huron Cement Wharf; 540-foot face; 19 feet alongside; deck height, 6 feet; open storage for 40,000 tons of salt; receipt of wood pulp and salt; owned and operated by Leicht Transfer and Storage Co.

Fort Howard Paper Co. Wharf: S side of the slip 0.4 mile above the Huron Cement Wharf; 1,100-foot face; 20 feet alongside; deck height, 7 feet; open storage for 450,000 tons of coal and salt; 110-ton derrick; receipt and shipment of heavy-lift items; receipt of coal, wood pulp, and salt; owned and operated by Fort Howard Paper Co.

Facilities on the E side of Fox River:

American Can Co. Dock: immediately below the mouth of East River; 1,027 feet of berthing space; 11 to 20 feet alongside; deck height, 6 feet; receipt of pulp wood; owned and operated by American Can Co.

U.S. Oil, Inc., Dock: 0.3 mile above river mouth; 298 feet of berthing space with dolphins; 21 feet alongside; deck height, 8 feet; storage tanks for 488,000 barrels; receipt of petroleum products; owned and operated by U.S. Oil, Inc.

Supplies.–Limited marine supplies and adequate foodstuffs are available. Water is available upon arrangements at Anamax Corp. Wharf, Leicht Transfer and Supply Co., North Dock Nos. 1 and 2, Huron Cement Dock, and American Can Co. Dock. Bunker C and diesel oil are available by truck.

Repairs.–Marine radio and radar repairs are available at Green Bay.

Small-craft facilities.–A marina on the E side of Fox River 3 miles above the mouth provides transient berths, gasoline, diesel fuel, water, ice, electricity, and marine supplies. A 12-ton hoist and 65-ton marine railway are available for hull and engine repairs. A 25-ton hoist and demasting service are available just S. Sewage pump-out facilities are available on the E side of the river 1.7 miles above the mouth.

Communications.–Green Bay has highway and rail connections. Passenger and freight air service is available at the airport W of the city.

Chart 14916.–Fox River rises above Berlin, Wis., and flows generally E, flowing through Lake Butte des Morts before emptying into the W side of **Lake Winnebago** at Oshkosh, Wis. The lower Fox River flows from the N end of Lake Winnebago at Menasha, Wis., and flows generally NE for about 39 miles to Green Bay. Above De Pere, Wis., the lower Fox River has been improved as necessary to provide a 6-foot channel to Lake Winnebago.

Caution.–Mariners transiting the Fox River from De Pere to Menasha are cautioned to stay within the channel. Depths outside the channel are very shallow over bedrock. Vessels have suffered severe damage from slight departures from the channel.

The rise from Low Water Datum at Green Bay to the level of Lake Winnebago is about 168.3 feet. This rise is accomplished by 17 locks and 2 guard locks. These locks have an available length of 144 feet, width of 35 feet, and depth of 6 feet over the sills at normal pool level. Lockage is provided from about May 1 to October 31, as determined by the District Engineer, U.S. Army Corps of Engineers. (See **33 CFR 207.460(a)**, chapter 2, for lock regulations.)

High-water periods on the Fox River, with currents up to 3 to 5 mph, continue for about 2 months on the average, beginning the latter part of March and extending into May. The low-water periods on the river average about 40 days, beginning in July and extending into September.

Caution.–During periods of moderate to high flow, mariners should be careful to avoid being drawn over the Menasha Dam by the hazardous outdraft.

Drydock.–A drydock basin is adjacent to the third lock at **Kaukauna, Wis.,** 23 miles above the mouth of Fox River. The drydock is owned by the U.S. Government, but is available for public use. It is fitted with wooden lock gates, and is filled by gravity through valves in the gates and emptied through a concrete culvert below the third lock. The drydock is 142 feet long with 132 feet on the keel blocks, has a width of 35 feet at the entrance, and has a depth of 6 feet over the sill. The widths inside the basin are 125 to 64 feet at the bottom and 173 to 91 feet at the top. (See **33 CFR 207.460(b)**, chapter 2, for drydock regulations.)

Menasha, Wis., is on the N side of Fox River at the outlet from Lake Winnebago. The dredged channel in the river leads from the lake between Menasha and **Doty Island,** in the center of the lake outlet. Two highway bridges and a railroad bridge cross the river at Menasha.

Menasha bridge regulations.–Section 1. It shall be unlawful for any person, persons, firm, partnership, or corporation to operate a boat upon the Government Canal within the corporate limits of the city of Menasha in such manner as to require the opening of the Racine Street or Washington-Tayco Street drawbridges during the following hours: 12:00 midnight to 8:00 a.m.; 11:50 a.m. to 12:10 p.m.; 12:45 p.m. to 1:00 p.m. and 3:40 p.m. to 4:15 p.m.

Sec. 2. Any person, persons, firm, partnership, or corporation violating the provisions of section 1 shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not to exceed $25 or by imprisonment in the county jail not more than 30 days, or by both such fine and imprisonment.

Special anchorages are at **Neenah, Wis.** in the Fox River S of Doty Island at its confluence with Lake Winnebago. See 33 CFR 110.1 and 110.79, chapter 2, for limits and regulations.)

Lake Winnebago is about 28 miles long with a maximum width of about 10 miles and a greatest depth of 20 feet. The waters of the lake are contained by dams on either side of Doty Island and by a lock at Menasha. Lake levels are usually highest between April and June and lowest between December and February. During the navigation season, water levels are regulated to stay within prescribed limits above Low Water Datum, 745.1 feet above Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955).

Lighthouse Reef, with rocks awash, is in the approach to the dredged river channel at Menasha. It is marked on the S side by a lighted buoy and on the W side by a buoy.

Caution.–Extensive fish nets are placed in Lake Winnebago from April through June by the Wisconsin Department of Natural Resources. Information on the location of the nets may be obtained from Wisconsin Department of Natural Resources, Calumet Harbor Station, P.O. Box 374, Fond du Lac, Wis. 54935.

The N shore of the lake is wooded and of moderate height. **High Cliff State Park,** at the NE corner of the lake, has a small-craft basin. The entrance to the basin, marked by a private **043°** lighted range, is protected by converging breakwaters marked at the outer ends by private lights. Transient berths and launching ramps are available.

Stockbridge Harbor and **Brothertown Harbor** are small harbors on the E side of Lake Winnebago, 10.5 and 17 miles SE of Menasha, respectively. The entrance to Stockbridge Harbor is marked by private buoys.

Calumet Harbor is on the SE side of the lake at the mouth of **Pipe Creek.** The entrance to the harbor is marked by buoys and a private **081½°** lighted range. In 1978, the dredged entrance channel had a controlling depth of 4 feet except for shoaling along the channel edges. Transient berths, water, and launching ramps are available.

Columbia Park Light (43°54.8'N., 88°19.8'W.), 91 feet above the water, is shown from an orange skeleton tower with a white spiral ladder on the S side of the entrance to Calumet Harbor.

Fond du Lac is a small-craft harbor at the S end of Lake Winnebago at the mouth of **Fond du Lac River.** A tank 1.4 miles S of the river mouth is prominent.

Channels.–A dredged channel, marked by lighted and unlighted buoys, leads from Lake Winnebago to

Structures across Fox River from De Pere to Lake Butte des Morts

**Miles above the mouth of the river*
***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above water datum		Remarks
				Right	Left	Center	Low	High	
	De Pere Lock		7.15						
1	Overhead cable	Power	7.17				69		
2	De Pere-George St. bridge	Highway	7.27			75	24		Bascule. Note 1.
3	Overhead cable	Power	12.67				83		
4	Overhead cable	Power	12.86				85		
5	Overhead cable	Power	13.10				77		
	Little Kaukauna Lock		13.12						
6	Overhead cable	Power	17.28				80		
7	Wrightstown bridge	Highway	17.36			70	16		Bascule. Note 3.
	Rapide Croche Lock		19.16						
8	Overhead cable	Power	19.50				86		
	Kaukauna Lock 5		22.69						
	Kaukauna Lock 4		23.04						
	Kaukauna Lock 3		23.22						
9	Kaukauna-Chicago & North Western Ry. bridge	Railroad	23.34		40		14		Swing. Right draw not available. Note 3.
	Kaukauna Lock 2		23.36						
10	Overhead cable	Power	23.55				80		
	Kaukauna Lock 1		23.57						
11	Kaukauna-Wisconsin Ave. bridge	Highway	23.78			90	7		Vertical lift. Clearance up 65 feet. Note 3.
12	Kaukauna-Lawe Ave. bridge	Highway	23.89			90	23		Bascule. Note 3.
	Kaukauna Guard Lock		23.98						
	Combined Locks		25.40						
13	Overhead cable	Power	25.47				75		
14	Overhead cable	Power	25.81				70		
	Little Chute Lock 2		26.34						
	Little Chute Guard Lock		26.53						
15	Little Chute-Mill St. bridge	Highway	26.53			35	4		Bascule. Note 3.
16	Little Chute-Kimberly bridge	Highway	26.70			143	54		Fixed.
17	Overhead cable	Power	27.20				82		
	Cedars Lock		27.32						
18	Overhead cable	Power	27.91				99		
19	Overhead cable	Power	29.89				85		
	Appleton Lock 4		30.76						
20	Appleton-College Ave. bridge	Highway	30.80				54		Fixed.
21	Overhead cable	Power	31.21				73		
22	Appleton-Chicago & North Western Ry. bridge	Railroad	31.22	60	59		4		Swing. Right draw not available. Note 3.
	Appleton Lock 3		31.31						
23	Overhead cable	Power	31.36				67		
24	Appleton-Lawe St. bridge	Highway	31.37			70	3		Bascule. Note 3.
	Appleton Lock 2		31.60						
25	Appleton-Oneida St. bridge	Highway	31.74			70	10		Bascule. Note 3.
25A	Appleton-Oneida Skyline bridge	Highway	31.85			70	54		Fixed.
	Appleton Lock 1		31.96						
26	Overhead cable	Power	32.01				83		
27	Appleton-Memorial Dr. bridge	Highway	32.36			132	54		Fixed.
28	Appleton-Chicago, Milwaukee, St. Paul & Pacific RR bridge	Railroad	32.38	60	61		9		Swing. Being removed in September 1982.
29	Overhead cable	Power	34.36				64		

Structures across Fox River from De Pere to Lake Butte des Morts (Continued)

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above water datum*		*Remarks*
				Right	*Left*	*Center*	*Low*	*High*	
30	Overhead cables	Power	34.56				56		
31	Little Lake Butte des Morts bridge	Highway	35.94			215	54		Fixed. Navigation through E center span.
	Menasha Lock		37.05						
32	Overhead cables	Power & Television	37.27				64		
33	Menasha-Soo Line RR and Chicago, Milwaukee, St. Paul & Pacific RR bridge	Railroad	37.28	60			3		Bascule. Note 3.
34	Menasha-Tayco St. bridge	Highway	37.52			100	3		Bascule. Note 3.
35	Menasha-Racine St. bridge	Highway	37.91			101	3		Bascule. Note 3.
36	Overhead cable	Power	37.92				60		
37	Oshkosh-Chicago & North Western Ry. bridge	Railroad	55.72	70	70		6		Swing. Note 3.
38	Oshkosh-Main St. bridge	Highway	55.97			89	11		Bascule. Note 2.
39	Oshkosh-Jackson St. bridge	Highway	56.22			97	11		Bascule. Note 2.
40	Overhead cable	Power	56.57				72		
41	Oshkosh-Soo Line RR bridge	Railroad	56.58	68	67		5		Swing. Note 3.
42	Oshkosh-Wisconsin St. bridge	Highway	56.72			75	12		Bascule. Note 2.
43	Overhead cable	Power	57.24				75		
44	Oshkosh-Congress Ave. bridge	Highway	58.01			75	13		Bascule. Note 2.
45	Overhead cable	Power	59.22				78		
46	Oshkosh-U.S. Route 41 bridge	Highway	59.24			76	31		Twin fixed.

Note 1.–See **33 CFR 117.1 through 117.59 and 117.1087(b)**, chapter 2, for drawbridge regulations.
Note 2.–See **33 CFR 117.1 through 117.59 and 117.1087(c)**, chapter 2, for drawbridge regulations.
Note 3.–See **33 CFR 117.1 through 117.49**, chapter 2, for drawbridge regulations.

the mouth of Fond du Lac River and upstream for 0.6 mile. In 1978, the midchannel controlling depth was 3½ feet. Overhead cables crossing the channel about 0.5 mile above the mouth have a reported least clearance of 60 feet.

Small-craft facilities.–Transient berths, gasoline, water, electricity, and sewage pump-out facilities are available in the municipal basin 0.8 mile E of the river mouth. The approach to the basin is marked by a private 181° lighted range, and the entrance is marked by private buoys. The entrance channel and basin have depths of 4 to 7 feet.

Oshkosh, Wis., is on the W side of Lake Winnebago, 13 miles S of **Menasha**, at the mouth of the upper Fox River. A tank 0.3 mile SW of the river mouth and a tower 0.8 mile NE of the river mouth are prominent.

Small-craft facilities.–A marina protected by breakwaters just S of the mouth of Fox River provides transient berths, gasoline, diesel fuel, water, electricity, and a launching ramp. The entrance to the marina is marked by a private light and buoys. Sewage pump-out facilities, marine supplies, hoists, and hull and engine repairs are available at marinas on the S side of Fox River.

A **special anchorage** area is in the S part of **Miller Bay**, about 1.8 miles N of the mouth of Fox River.

From Lake Winnebago, the **Fox River** extends 3 miles NW to **Lake Butte des Morts.** This section of the river has depths of 12 feet or more at midchannel. A winding channel, marked by buoys, leads through Lake Butte des Morts, and thence Fox River extends SW from the SW side of the lake. The towns of **Omro, Wis., Eureka, Wis.,** and **Berlin, Wis.,** are about 4, 10, and 18 miles above the lake, respectively. In 1978, it was reported that depths of about 3 feet could be carried to Berlin.

Pools on the upper Fox River are maintained by water control structures at Fort Winnebago, Governor Bend, Montello, Grand River, Princeton, White River, and Berlin. The locks at these locations have been removed; hand-operated haulovers are available at Montello, Grand River, Princeton, White River, Berlin, and Eureka to move small-craft between pools. A lock at Eureka is operated on weekends and holidays from May 25 through September 30 annually by local interests.

Wolf River flows from the N and joins Fox River at **Winneconne, Wis.**, at the NW end of Lake Butte des Morts. Wolf River has a project depth of 4 feet

Structures across the Wolf River

**Miles above the mouth of the river*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above water datum		Remarks
				Right	Left	Center	Standard low water	Extreme high water	
1	Overhead cable	Power	2.18				89	82	
2	Overhead cable	Power	2.37				75	68	
3	Winneconne bridge	Highway	2.43			70	7	2	Bascule. Note 1.
4	Overhead cable	Power	20.93				71	64	
5	Overhead cable	Power	22.38				82	75	
6	Fremont bridge	Highway	22.43			161	20	12	Fixed.
7	Overhead cable	Power	22.44				60	53	
8	Overhead cable	Power	27.70				68	60	
9	Gills Landing-Soo Line RR bridge	Railroad	27.83	56	56		9	0	Notes 2 and 3.
10	Overhead cable	Power	27.84				47	38	
11	Northport bridge	Highway	42.70			96	15	5	Fixed.
12	Overhead cable	Power	42.72				35	25	
13	Overhead cable	Power	42.74				68	58	
14	New London-Shawno St. bridge	Highway	46.13			62	15	3	Fixed.
15	Overhead cable	Power	46.37				67	55	
16	New London-Pearl St. bridge	Highway	46.43			100	15	3	Fixed.
17	Overhead cable	Power	46.63				58	46	

Note 1.-See CFR 117.1 through 117.59 and 117.1107, chapter 2, for drawbridge regulations.
Note 2.-See CFR 117.1 through 117.49, chapter 2, for drawbridge regulations.
Note 3.-Advance notice of 24 hours is required for bridge opening; telephone, 715-344-1910.

from the mouth upstream for about 47 miles to New London. The river banks rise 4 to 10 feet above the low-water surface; during flood stage the river rises 6 to 12 feet above the summer stage and during freshets the banks are generally overflowed.

Charts.-The E half of Lake Butte des Morts is covered by NOS Chart 14916. Coverage of the upper Fox River and the Wolf River above Lake Butte des Morts is on maps available from Fox River Marina, Inc., Oshkosh, Wis.

Charts 14918, 14910.-The head of Green Bay, from the mouth of Fox River N for about 3.5 miles to Long Tail Point on the W and Point au Sable on the E, is filled by a shallow expanse through which the entrance channel to the Fox River has been dredged.

Long Tail Point, a low ridge submerged in places, reaches SE about 3 miles from the shoreline just S of the mouth of Suamico River. **Dead Horse Bay,** on the SW side of Long Tail Point, has good anchorage for small craft in depths of 8 to 10 feet, sand and gravel bottom. A marina on the W side of the bay provides berths, electricity, gasoline, and sewage pump-out.

Duck Creek, flowing into Green Bay 1.5 miles NW of the mouth of Fox River, is navigable by small craft for 2.7 miles above the mouth. The creek has depths of 1 to 3 feet through marshy areas near the mouth, thence 3 feet in the creek.

Suamico River is a small stream flowing into Green Bay about 6 miles N of the mouth of Fox River.

Channels.-A dredged entrance channel leads from deep water in Green Bay to the mouth of the river and thence upstream for 0.3 mile. The entrance channel is marked by a light, lighted buoys, and a private unlighted buoy. In January 1984, the controlling depth was 1 foot in the entrance and river channels.

A submerged discharge structure, marked by a buoy, is on the S side of the bend at the entrance to the river. Caution should be exercised in the area.

A fixed highway bridge with a clearance of 10 feet crosses the river about 1.5 miles above the mouth.

From Suamico River N for 14 miles to Pensaukee, the shore is bordered by shoals extending about 3 miles off. Depths of 2 feet are as much as 1.7 miles off. **Little Tail Point,** 3 miles N of Suamico River, is a narrow ridge, nearly level with the water surface, that extends about 1.8 miles SE from shore. **Little Suamico River** is a small stream 5 miles N of Suamico River.

Charts 14902, 14910.–Pensaukee Harbor is at the mouth of **Pensaukee River,** on the W shore of Green Bay about 14 miles N of Suamico River.

Channels.–A dredged entrance channel leads from deep water in Green Bay to the mouth of the river. A lighted buoy marks the outer end of the dredged channel, and a light marks the pier ruins on the N side of the river mouth. In February 1985, the midchannel controlling depth was 2½ feet.

The only facilities available at Pensaukee Harbor are for fish tugs which moor on the S side of the river mouth.

From Pensaukee Harbor NE for 6.5 miles to the mouth of Oconto River, shoals extend 3.8 miles from shore. **Pensaukee Shoal,** with depths of 1 to 4 feet, extends 3 miles SE from shore about 2 miles NE of Pensaukee Harbor. A wreck, covered 4 feet and marked on the E side by a buoy, is 4.2 miles ENE of the mouth of Pensaukee River. A shoal bank with depths of 1 to 5 feet extends 2.3 miles SE from shore just S of the mouth of Oconto River. **Oconto Shoal,** with a least depth of 11 feet, is a detached bank 3.6 miles SE of Oconto River mouth.

Oconto Harbor is at the mouth of **Oconto River,** on the W shore of Green Bay about 27 miles N of the mouth of Fox River. The city of **Oconto, Wis.,** is about 2 miles up the river. Below Oconto the river traverses an area of low, swampy ground, the elevation of which is only slightly above the surface of the river.

Channels.–A dredged entrance channel leads from deep water in Green Bay between two piers to a turning basin inside the mouth of the river. The outer end of the S pier is marked by a light, and the outer end of the N pier and a stub near its midlength are marked by private lights. In February-May 1985, the controlling depths were 6 feet in the approach channel, thence 4 feet at midchannel between the piers, and thence 2 feet in the E end of the turning basin and about 1 foot in the W end, where severe shoaling exists.

A spoil bank about 40 feet wide extends about 400 feet from shore into the center of the W end of the turning basin. The N side of the turning basin has a channel width of about 100 feet between the dredge bank and the N channel line.

Inside the shoreward ends of the piers, the banks of the river are generally unprotected by revetments, and bars form in the wide portions of the channel from scour in the narrower parts during severe freshets. A depth of about 4 feet can be carried for 1 mile in the river with local knowledge.

A fixed highway bridge with a clearance of 9 feet crosses the river at Oconto.

Small-craft facilities.–Marinas on the N side of the river provide transient berths, gasoline, water, electricity, sewage pump-out, limited marine supplies, and launching ramps. A 15-ton hoist is available for hull and engine repairs.

From the mouth of Oconto River, the shore trends N for about 3 miles and then curves E for about 9 miles to the mouth of **Peshtigo River.** The shore in this stretch is low and wooded, and the broad bight between the mouths of the two rivers is shallow, with prevailing depths of 1 to 12 feet. A detached shoal with a least depth of 17 feet is 6.5 miles E of the mouth of Oconto River. The approach to Peshtigo River is marked by a lighted bell buoy 0.9 mile S of the mouth.

Peshtigo Point is a low marshy point just E of the mouth of Peshtigo River. **Peshtigo Reef,** with depths of 1 to 6 feet, extends 3 miles SE from the point. **Peshtigo Reef Light** (44°57.4′N., 87°34.8′W.), 72 feet above the water, is shown from a white conical tower on a cylindrical base at the outer end of the reef; a fog signal is at the light.

Charts 14902, 14910, 14909.–From Peshtigo Point N for 8 miles to Menominee River, the shore is bordered by a sandy ledge that extends 2 miles offshore. In the S part of the reach, depths on the ledge are 5 to 10 feet, but in the N part of the reach, **Menekaunee Shoal** uncovers and is marked on the outer edge by a buoy. A wreck, covered 2 feet, 0.4 mile SE of Menominee Pierhead Light, is a hazard to small craft.

A private light marks the S side of the mouth of **Little River,** about 3.3 SSW of the mouth of Menominee River.

Green Island is a wooded island 5 miles SE of the mouth of Menominee River. Shoals extend about 0.2 mile off the N and S shores. A shoal that extends 0.7 mile SE from the E end of the island is marked off the outer end by a buoy, and a shoal with depths of 3 to 11 feet that extends W from the island is marked at the outer end by a lighted buoy. The area surrounding Green Island should be avoided by deep-draft vessels, because it is foul with stones and waste discharged from dredging operations. **Green Island Light** (45°03.3′N., 87°29.5′W.), 80 feet above the water, is shown from a skeleton tower with a red and white diamond-shaped daymark on the SE end of the island.

Charts 14909, 14917.–Marinette, Wis., on the S side, and **Menominee, Mich.,** on the N side, form a deep-draft harbor at the mouth of **Menominee River.** The harbor is on the W side of Green Bay, about 33 miles SW of Porte des Morts Passage and 17 miles NW of the Sturgeon Bay Ship Canal. Menominee River forms the **State boundary** between Wisconsin and Michigan for about 150 miles from the mouth. The principal commodities handled in the harbor are coal, stone, sand, and salt.

Prominent features.–Prominent are the easternmost stack on the N side of the river mouth, a radio tower 1.1 miles NW of the river mouth, and a yellow brick stack 2.3 miles NNW of the river mouth.

Menominee Pierhead Light (45°05.8′N., 87°35.1′W.), 46 feet above the water, is shown from a red octagonal tower on a square concrete base on the outer end of the N pier.

Channels.–A dredged entrance channel leads SW from deep water in Green Bay between parallel piers at the mouth of Menominee River and thence upstream for about 1.7 miles to about 600 feet below the Dunlap Avenue bridge. A turning basin is on the S side of the channel about 1 mile above the mouth. The entrance channel is marked by buoys, and the outer ends of the piers and the inner end of the N pier are marked by lights. In 1982, the controlling depths were 19 feet (23 feet at midchannel) in the approach channel except for minor shoaling off the ends of the piers; thence 21 feet at midchannel to the Ogden Street bridge; thence 19 feet at midchannel to the municipal wharf above the turning basin; with 13 to 20 feet in the basin with severe shoaling along the S and SE edges; thence 19 feet to Menominee River Buoy 4; then 9 feet to the upstream limit of the project.

Mariners are cautioned against navigating outside channel limits in the vicinity of structures protected by stone riprap.

Currents in the river attain velocities up to 3 mph.

Above the dredged channel, the river has depths of 1 to 5 feet and is obstructed by numerous rocks. A dam blocks the river 0.7 mile above the dredged channel.

Dangers.–The entrance channel, lakeward of the piers, is bordered closely by shoals on either side. **Menominee Shoal,** a detached shoal with a least depth of 17 feet, is 0.8 mile NE of Menominee Pierhead Light and is marked on the E side by a lighted bell buoy. A 14-foot spot is 0.2 mile NE of the light.

Bridge.–A bascule highway bridge with a clearance of 18 feet at the center crosses Menominee River about 0.7 mile above the pierheads. (See **33 CFR 117.1 through 117.59 and 117.1091,** chapter 2, for drawbridge regulations.)

Towage.–Tugs for Menominee and Marinette are available from Sturgeon Bay and Green Bay. (See Towage under those ports.)

Marinette is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Harbor regulations.–A **speed limit** of 4 mph (3.5 knots) is enforced in the harbor. (See **33 CFR 162.120,** chapter 2, for regulations.)

Wharves.–There are three deep-draft facilities at Menominee and Marinette. The alongside depths given for these facilities are reported depths. (For information on the latest depths, contact the operators.)

Menominee Paper Co. Dock: N side of the river mouth; 600 feet of berthing space with dolphins; 19 feet alongside; deck height, 7 to 8 feet; 45,000 square feet covered storage; open storage for 30,000 tons of coal; receipt of coal and occasionally paper pulp; owned and operated by Menominee Paper Co.

Marinette Fuel and Dock Co. Dock: S side of the river mouth and N side of the slip at the river mouth; 900-foot face riverside, 18 to 21 feet alongside; 700-foot face slipside, 17 to 22 feet alongside; deck heights, 5 and 6 feet, respectively; 11 acres open storage; rail connections; receipt of stone, coal, sand, and salt; owned and operated by Marinette Fuel and Dock Co.

The Ansul Co. Dock: S side of the river 1.5 miles above the pierheads; 700-foot face; 19 feet alongside; deck height, 4 feet; open storage for 25,000 tons of coal; rail connections; occasional receipt of coal; owned and operated by The Ansul Co.

Repairs.–Marinette Marine Corp., a shipbuilder on the S side of the river 1.7 miles above the pierheads, can make emergency above-the-waterline repairs. A 40-ton mobile hoist is available.

Small-craft facilities.–A marina on the S side of the river 2 miles above the pierheads provides transient berths, gasoline, diesel fuel by truck, water, electricity, sewage pump-out, and some marine supplies. A 40-ton hoist can handle craft to 65 feet long for hull and engine repairs. A municipal marina developed by the city of Menominee and the Michigan State Waterways Commission is protected by breakwaters on the lakefront 1 mile NW of the river mouth. The entrance to the marina basin is marked on the E side by a private light. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, a hoist for small sailboats, and launching ramps are available.

Charts 14902, 14909.–From Menominee River, the shore is low and wooded for 24.5 miles NNE to Cedar River. Shoals extend as much as 1.3 miles from shore, with depths of 8 to 12 feet near the outer edge. **Ingallston** and **Arthur Bay** are small fishing settlements about 8 and 16 miles N of Menominee River, respectively.

Cedar River, Mich., is a small village at the mouth of **Cedar River,** across Green Bay W of Porte des Morts Passage. The mouth of the river is protected by E and W piers. In 1978, the E pier was in ruins and partially submerged. The approach to the river is marked by a buoy, and the outer end of the W pier is marked by a light. In 1968, the controlling depth was 5 feet between the piers and upstream for 0.4 mile to the fixed highway bridge at the head of navigation. The bridge has a clearance of 10 feet. Gasoline and a launching ramp are available at Cedar River.

Whaleback Shoal, with a least depth of 3 feet, is in the middle of Green Bay, 8.5 miles E of Cedar River. The shoal is marked at the NW end by a buoy and at the SE end by a lighted bell buoy. The shoal is a hazard to vessels, especially in foul weather.

Charts 14902, 14909, 14908.–The shore is low and wooded from Cedar River NNE for 21 miles to Ford River. The shoal border in this stretch is irregular, and there are numerous submerged rocks. A 4-foot spot is 0.6 mile NE of **Deadmans Point,** 2 miles N of Cedar River. Just S of **Deer Creek,** 5.8 miles N of Cedar River, a shoal with two rocks covered about 1 foot near its outer end extends 0.7 mile from shore. A rock awash is 0.7 mile offshore 10 miles N of Cedar River.

Time.–Areas generally S and W of Deer Creek observe central standard time or central daylight saving time. Michigan communities N of Deer Creek observe eastern standard time or eastern daylight saving time.

Charts 14908, 14915.–**Little Bay de Noc** is the W arm of the N end of Green Bay. The bay is entered between **Fishery Point** on the W and Peninsula Point on the E. Very shallow ledges extend off both sides of the bay, but the natural channel up the middle of the bay has good deep water and permits the passage of the deeper draft vessels on the lakes.

Ford River, Mich., is a small fishing village at the mouth of **Ford River** on the W side of the entrance to Little Bay de Noc.

From a point on shore about 4 miles SW of Ford River, a shoal bank extends about 6.5 miles E and thence N for about 7 miles to Sand Point at the city of Escanaba. The bank, forming the W limit of the deepwater channel into the bay, is marked on the SE side by a lighted buoy. Depths on the bank are 1 to 20 feet, but at the edge increase quickly to 50 feet and more in the channel.

A 24-foot spot, marked on the W side by a lighted buoy, is on the E side of the vessel route into the bay, 1.1 miles SE of Sand Point.

Escanaba, Mich., is on the W side of Little Bay de Noc, 6 miles NE of Ford River and 7 miles NW of Peninsula Point. A lighted red brick cylindrical building in the city is prominent. **Sand Point,** marked by a private light, extends E from shore at the city and protects the harbor area on its N side. The harbor has depths of 28 to 40 feet within 0.4 mile of shore and affords access for the largest vessels on the lakes. **Escanaba River** flows into the harbor 2.5 miles NW of Sand Point.

Escanaba Light (45°44.7'N., 87°02.2'W.), 45 feet above the water, is shown from a white square tower on a crib on the NE side of the shoal on the N side of Sand Point; a fog signal is at the light. A buoy 0.35 mile W of the light marks the N side of an obstruction.

Local magnetic disturbance.–Differences from normal variation of up to 17° have been observed in the vicinity of Escanaba.

Caution.–A submerged piling, covered 22 feet, is 0.3 mile SE of Chicago and North Western Transportation Co., Ore Dock No. 6.

Towage.–Tugs are available from Sturgeon Bay. (See Towage under Sturgeon Bay.)

Escanaba is a **customs station.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Wharves.–Escanaba has several deep-draft facilities on the W side of the harbor N of Sand Point. (For complete information on the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) All the facilities described have highway connections and some have railway connections.

The C. Reiss Coal Co., Dock No. 2: 1 mile WNW of Escanaba Light; 1,900-foot face; 21 to 24 feet alongside; deck height, 7 feet; open storage for 170,000 tons of coal; receipt of coal; owned and operated by The C. Reiss Coal Co.

Chicago and North Western Transportation Co., Ore Dock No. 6: 1.7 miles NW of Escanaba Light; 1,979-foot N and S faces; 28 to 31 feet alongside S face, 28 to 35 feet alongside N face; deck height, 2 feet at pilings increasing to 8 feet at top of dock fill; open storage for 2 million tons of material; one traveling ship loader, average rate, 4,000 tons per hour; shipment of iron ore and iron ore pellets; owned and operated by Chicago and North Western Transportation Co.

Escanaba Coal and Dock Co., Dock No. 1: 2.1 miles NW of Escanaba Light, 1,050-foot face; 21 to 27 feet alongside; deck height, 5 feet; open storage for 125,000 tons of coal; tank storage for 330,000 barrels; receipt of coal and petroleum products; owned by Escanaba Coal and Dock Co. and operated by Escanaba Coal and Dock Co., Upper Peninsula Power Co., and Standard Oil Division of Amoco Oil Co.

Escanaba Terminal Dock: 1 mile N of the mouth of Escanaba River; offshore wharf, 278 feet of berthing space with dolphins; 28 feet alongside; deck height, 9 feet; tank storage for 640,000 barrels; receipt of petroleum products; owned by U.S. Government and operated by Continental Services Co., Inc.

Repairs.–T.D. Vinette Co. makes emergency above-the-waterline repairs to vessels at their berths.

Small-craft facilities.–A small-craft basin, developed by the city and the Michigan State Waterways Commission, is on the S side of Sand Point. A small island, connected to the mainland by a bridge at the W end, forms the S side of the basin. The entrance to the basin has depths of 9 feet, with 1 to 12 feet in the basin. A private light on Sand Point marks the N side of the entrance. Transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, and a launching ramp are available. A boatyard 0.5 mile S of Escanaba River has a 50-ton vertical boat lift and can make repairs to 80-foot vessels.

From Sand Point the shore extends N, then bends NE to Saunders Point at Gladstone. Very shallow water extends up to 0.6 mile from shore in this reach.

Gladstone, Mich., is on the W side of Little Bay de Noc, 7 miles N of **Escanaba. Saunders Point,** marked by a light, extends E from shore at Gladstone and protects the harbor area on its N side. The E part of the harbor has depths of 23 to 30 feet, with shoaling to less than 10 feet in the W part. Buoys mark the E and N extent of shoals on the N side of Saunders Point.

Lighted radio masts in Gladstone form a range useful as a guide into Little Bay de Noc, except in the vicinity of Sand Point where the range brings vessels too close to the shoals.

Channels.–A dredged channel, marked by buoys, leads from the deep water in Little Bay de Noc to a basin off the waterfront at Kipling, 1.5 miles N of Saunders Point. In 1977, the controlling depth was 23 feet in the channel and basin.

Anchorage.–**Squaw Point,** marked by a light, extends from the E side of Little Bay de Noc 1.2 miles S of Saunders Point. A deep channel leads between the points, and owing to their respective positions, a virtually landlocked anchorage is formed above Saunders Point, mud bottom.

Towage.–Tugs are available from Sturgeon Bay. (See Towage under Sturgeon Bay.)

Wharves.–Gladstone has four deep-draft facilities on the N side of Saunders Point. (For a complete description of the port facilities, refer to Port Series No. 48, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operators.) The facilities described have highway connections.

Marathon Oil Co. Dock: 0.3 mile NW of Saunders Point Light; 145 feet of berthing space with dolphins; 19 feet alongside; deck height, 4 feet; tank storage for 160,000 barrels; open storage for 10,000 tons of coal; receipt of coal and petroleum products; owned by city of Gladstone and operated by Marathon Oil Co. and city of Gladstone.

Delta Coal and Dock Co. Dock: immediately W of Marathon Oil Co. Dock; 910-foot face; 20 feet alongside; deck height, 10 feet; open storage for 60,000 tons of bulk material; receipt of coal, salt, and miscellaneous bulk materials; owned and operated by Delta Coal and Dock Co.

Bay de Noc Oil Co., Inc., Gladstone Marine Terminal Wharf: immediately W of Delta Coal and Dock Co. Dock; 195 feet of berthing space with dolphins, 22 feet alongside; deck height, 5 feet; tank storage for 143,000 barrels; receipt of petroleum products; owned and operated by Bay de Noc Oil Co., Inc.

Cities Service Co., Marine Terminal Dock: 1.5 miles NNW of Saunders Point; 452-foot face; 18 feet alongside; deck height, 5 feet; tank storage for 546,000 barrels; receipt of petroleum products; owned and operated by Cities Service Co.

Small-craft facilities.–A small-craft basin, developed by the city and the Michigan State Waterways Commission, is 1.2 miles SW of Saunders Point. The entrance to the basin, with a reported depth of 7 feet in 1978, is protected on the SW side by a pier and detached breakwater. The E end of the breakwater is marked by a private light and the entrance channel is marked by buoys. The basin has reported depths of 6 to 10 feet. Gasoline, water, electricity, marine supplies, and sewage pump-out facilities are available. A marina on the E side of the basin provides transient berths, gasoline, water, and electricity. A marina 1.2 miles WNW of Saunders Point Light provides transient berths, gasoline, diesel fuel by truck, water, electricity, sewage pump-out, some marine supplies, and a launching ramp. A 3-ton fixed hoist is available for engine and minor hull repairs.

Tacoosh River, Rapid River, and Whitefish River flow into the N end of Little Bay de Noc through a common mouth between spits of land that extend from the E and W shores of the bay. An undefined, narrow, and tortuous channel through the mouth had a controlling depth of 3 feet in 1965.

Shoals extend about 1 mile from the head of Little Bay de Noc. From the head of the bay to Squaw Point, depths of 1 to 3 feet extend about 0.3 mile off the E shore. Below Squaw Point, the shoal border increases to a width of over 2 miles and is marked on the W side by a lighted buoy 5.1 miles S of Squaw Point opposite the village of **Stonington, Mich.** The shore in the vicinity of Stonington is bluff. Below Stonington the shoal border decreases from 0.5 mile wide to about 0.2 mile wide at **Dutchman Point,** 4 miles S. From Dutchman Point to Peninsula Point, the shore should be given a berth of 0.8 mile.

Peninsula Point (45°40.1'N., 86°58.0'W.) is the S point of the peninsula that separates Little Bay de Noc and Big Bay de Noc at the N end of Green Bay. **Peninsula Point Shoal,** a rocky ledge with depths of 1 to 6 feet, extends 1.1 miles S from the point. Depths less than 18 feet extend 1 mile farther S, and detached shoals reach about 8 miles S of Peninsula Point. **Eleven Foot Shoal,** with a least depth of 5 feet, is 2.2 miles S of the point. A buoy is off the W side of the shoal. Vessels without local knowledge should not pass N of this shoal. **Corona Shoal,** with a least depth of 12 feet, is 3.4 miles S of Peninsula Point. A lighted bell buoy is 1.3 miles W of the shoal, on the E side of the vessel route into Little Bay de Noc.

Charts 14908, 14909.–**Minneapolis Shoal,** with a least depth of 15 feet, is 6.2 miles S of Peninsula Point. **Minneapolis Shoal Light** (45°34.9'N., 86°59.9'W.), 82 feet above the water, is shown from a square cream-colored tower on a concrete base on the shoal; a fog signal and a radiobeacon are at the light. The light should be given a berth of at least 0.25 mile. **Drisco Shoal,** with a least depth of 9 feet, is 2.4 miles SE of Minneapolis Shoal Light and is marked at the S end by a lighted bell buoy. **North Drisco Shoal,** a boulder bank covered 17 feet, is 1.5 miles ESE of Minneapolis Shoal Light. Several 21- to 24-foot spots are in the vicinity. These shoals lie close to the track of vessels bound from Rock Island and Porte des Morts Passages to Little Bay de Noc.

Chart 14908.–**Big Bay de Noc** is the NE arm of Green Bay, between Peninsula Point on the W and Garden Peninsula on the E. Numerous submerged net stakes are throughout the bay.

From Peninsula Point, the shore is low and wooded for 7.2 miles NE to **Chippewa Point.** Shoals extend from about 1 to 2 miles offshore. From Chippewa Point NNE for 6 miles to **St. Vital Point,** numerous rocks awash are within 1.1 miles of shore. **Round Island,** 4 miles ENE of Chippewa Point, is surrounded by shoals, 0.7 mile to N and 0.5 mile to

S. A shoal with least depths of 2 feet is 0.9 mile NW of Round Island, 1.7 miles from the adjacent mainland shore. **Ripley Shoal,** with a least depth of 1 foot, is 1.3 miles N of Round Island. **St. Vital Island,** 1 mile E of St. Vital Point, is connected to it by a shallow bank with depths of 1 to 4 feet and rocks awash.

Ogontz Bay is a shallow bight on the NW side of Big Bay de Noc between St. Vital Point on the W and **Indian Point** on the E. Between Indian Point and **Stony Point,** 3.5 miles E, **Big Bay de Noc Shoal** extends 6.6 miles S into the center of Big Bay de Noc. The bank has depths of 3 to 7 feet at the S end and is marked at the S end by a buoy.

Nahma, Mich., is a small village on the shore W of Stony Point and at the mouth of **Sturgeon River.** It contains the mills and docks of the American Playground Device Co. Three dilapidated docks extend about 450 feet into the bay, and E therefrom are the ruins of four other docks. There is a reported depth of about 12 feet between the docks, but they should be approached with extreme caution. The water is shoal on the W side of the W dock and on the E side of the E dock.

From Stony Point, the NE part of Big Bay de Noc extends NE for 3.8 miles to **Porcupine Point,** thence curves around through N to **Valentine Point** on the E side, thence extends SSW for 4.1 miles to **Ansels Point.** This part of the bay has central depths of 15 to 22 feet with gradual shoaling toward the shores. **Garden Bay,** on the S side of Ansels Point, has available depths of 8 to 12 feet and affords anchorage with protection from all but SW to NW winds. Between **Garden Bluff,** on the S side of Garden Bay, and **Middle Bluff,** white in color and 4 miles SSW, the shore is indented by a shallow bay. **Snake Island** is in the S end of the mouth of this bay, just N of Middle Bluff.

Snail Shell Harbor, a small cove just S of Middle Bluff, provides excellent protection for recreational craft. The entrance to the harbor is marked by a lighted bell buoy. In 1978, depths of 20 feet were reported in the entrance, with 10 feet along the W shore and 6 feet along the S shore. Transient berths and gasoline are available in the cove. **Fayette, Mich.,** is a town at the head of the cove.

Sand Bay, the broad bight just S of Snail Shell Harbor, has deep water within 0.3 mile of shore. **Burnt Bluff,** on the S side of Sand Bay, is deep-to, and this trend continues S for 3 miles to the W point of Sac Bay. A small private artificial small-craft basin is on the W side of Burnt Bluff. Transient berths, water, and electricity are available.

Sac Bay, a small indentation in the SW end of Garden Peninsula, provides anchorage with protection from all but SE to W winds.

Fairport, Mich., a small fishing settlement midway between Sac Bay and Point Detour, has several landings with depths of 5 to 6 feet at their outer ends. A sandy and stony flat connects the mainland shore at Fairport with the Summer Islands to the S. A narrow 6-foot channel leads across the flat, following close to the mainland shore. The channel is obstructed by a 1-foot spot, marked on the NW side by a buoy.

Point Detour (45°36.1'N., 86°36.7'W.), the S extremity of Garden Peninsula, is the N entrance point to Green Bay. The islands and passages S of the point were described previously.

Between Point Detour and Point aux Barques, 18 miles NE, the E shore of Garden Peninsula is broken by a series of bays and inlets opening to the E and S. Shoals extend about 0.8 mile S from Point Detour. A detached 16-foot shoal is 3.3 miles E of the first point N of Point Detour. From Point Detour to **Portage Bay,** 10 miles NE, the shore should be given a berth of 1 mile. Between Portage Bay and **Parent Bay,** 15 miles NE of Point Detour, rocks awash and shoals covered 1 to 6 feet extend as much as 2 miles offshore. Shoals extend over 1 mile SE from each side of the entrance to Parent Bay. Between the shoals, deep water extends to within 0.4 mile of the head of the bay. From Parent Bay E to Point aux Barques, shoals and rocks awash extend 1 mile from the bluff shore. At **Point aux Barques** (45°48.0'N., 86°21.0'W.) a shoal extends SE about 1.5 miles. In August 1982, a rock covered 5 feet was reported at the outer end of the shoal in about 45°47'08"N., 86°19'48"W.

From Point aux Barques, the low sandy shore trends N and then NE for about 12 miles to Manistique Harbor. In this stretch, shoals extend about 0.5 to 1 mile offshore, except at **Wiggins Point,** 4 miles N of Point aux Barques. **Wiggins Point Shoal,** with prevailing depths of 2 to 13 feet and rocks awash, extends about 2 miles offshore around the point. A lighted bell buoy marks the outer edge of the shoal.

Manistique Harbor, serving the town of **Manistique, Mich.,** is at the mouth of **Manistique River** on the N shore of Lake Michigan 73 miles W of the Straits of Mackinac. A stack 0.9 mile NNW of the river mouth and a silver tank 0.8 mile NNE of the river mouth are prominent.

Manistique Light (45°56.7'N., 86°14.8'W.), 50 feet above the water, is shown from a red tower on a concrete base on the outer end of the E breakwater; a fog signal and a radiobeacon are at the light.

Channels.–The dredged entrance channel leads NE from deep water in Lake Michigan between converging breakwaters through an outer basin to the mouth of the Manistique River. The W side of the river entrance is protected by a pier. The outer ends of the breakwaters and the pier are marked by lights. In 1971-1979, the controlling depths were 18 feet in the approach channel, thence in 1979, 15 feet in the outer basin except for shoaling along the SE side, thence in 1976-1979, 9½ feet through the mouth of the river to a point about 1,200 feet above the outer end of the pier.

The channel and basin are not adapted for anchorage, and mooring to the breakwaters and pier is prohibited.

The current in the channel attains velocities up to 3 mph.

Above the dredged channel, there are a number of abandoned wharves with channels between having depths of about 7 feet.

Caution.–Several shoals should be avoided by vessels approaching Manistique Harbor. A 23-foot spot is 3.1 miles S of Manistique Light. A rocky ledge, covered 18 feet, is 0.8 mile SSW of the light. Rock ledges, covered 8 to 17 feet, extend 0.4 mile S from the outer end of the E breakwater and 0.3 mile SW from the outer end of the W breakwater.

Small-craft facilities.–A small-craft basin developed by the town and the Michigan State Waterways Commission is on the E side of the river 0.3 mile above the mouth. Transient berths, gasoline, water, ice, electricity, and sewage pump-out facilities are available.

From Manistique Harbor E for 4.5 miles to **Dutch Johns Point,** shoals extend 0.3 to 1.2 miles offshore. A detached 16-foot spot is 2 miles SE of the point, and detached 19-foot spots are 1.7 and 2.3 miles S of the point. These shoals should be avoided when approaching Manistique Harbor.

Chart 14911.–About 2.5 miles E of Dutch Johns Point, the shoal border decreases to 0.3 mile wide for about 9.5 miles ESE to Seul Choix Point. **Seul Choix Point Light** (45°55.3'N., 85°54.7'W.), 80 feet above the water, is shown from a white conical tower connected to a red dwelling on **Seul Choix Point.**

A bay that opens between Seul Choix Point and **Hughes Point,** 4.5 miles NE, is protected from the N and W and has deep water within 0.8 mile of shore. A detached shoal with a least depth of 9 feet is 0.9 mile S of Hughes Point.

Port Inland is a private harbor of the Inland Lime & Stone Co., built on the lake in front of the company's plant about 4 miles NE of Seul Choix Point.

The harbor basin is protected by a breakwater, marked at the outer end by a private light with a fog signal, that extends S and W from shore. The privately dredged entrance channel has depths of about 25 feet and is marked by a private **000°** lighted range. A radiobeacon is 90 feet N of the front range light. A private **047°** lighted range marks the channel through the harbor basin.

Limestone is shipped from a 900-foot wharf on the NW side of the basin. The wharf has a deck height of 9 feet and reported depths of 25 feet alongside. There is open storage for 200,000 tons of limestone.

From Hughes Point, the shore trends E for 7 miles to **Scott Point** and thence 2 miles to **Point Patterson** (45°58.1'N., 85°39.3'W.). This stretch is filled with shoals and rocks extending 0.5 to 1 mile offshore.

From Point Patterson, the shore extends NE for 11 miles, thence E for 3.5 miles to **Millecoquins Point** (46°05.2'N., 85°26.8'W.). NE of Point Patterson the shoal border increases to a width of 2.8 miles and thence decreases to about 0.4 mile in the bight W of Millecoquins Point. Numerous submerged net stakes are within about 5 miles of shore in this stretch. **Cranberry Shoal,** with rocks awash, is 1.7 miles offshore 5.7 miles NE of Point Patterson. A detached 11-foot shoal is 1.3 miles WSW of Millecoquins Point, and a rock awash is 0.3 mile offshore 1 mile W of the point.

Naubinway Island, about 0.8 mile S of Millecoquins Point and marked by a light, is a small island surrounded by rocks and shoals. A 1-foot spot is 0.6 mile E of the island, and a detached 14-foot shoal is 0.8 mile SW of the island. **Naubinway Reef,** a rocky ledge with a least depth of 4 feet, is 1.5 miles SE of Naubinway Island. A detached 14-foot spot is midway between the reef and island.

Potter Reef, with a least depth of 1 foot and marked on the NE side by a buoy, is 7.3 miles SSW of Millecoquins Point and 6.5 miles ENE of Point Patterson. **Millecoquins Reefs** is a group of detached 7- to 13-foot spots that extend over 2 miles NW and SE, about 5 miles S of Millecoquins Point. A buoy marks the W end of the reefs. A number of detached shoal spots are within 3.5 miles S of Millecoquins Reefs. The shoalest are a boulder covered 9 feet 1.4 miles SE, 12-foot spots 2.2 and 3 miles S, and a 14-foot spot 1.3 miles SW. These reefs and shoals are out of the normal vessel routes and are unmarked.

Lansing Shoals, Fagan Reef, Simmons Reef, and other shoals farther S in the vicinity of Beaver Island are described earlier in the chapter.

Between Millecoquins Point and **Biddle Point,** 3.3 miles E, a small bay has general depths of 12 feet or more with shoals within 0.4 mile of shore. On the W side of the bay, 2- and 7-foot spots are 0.6 mile ENE and E of Millecoquins Point, respectively.

Naubinway, Mich., is a village on the W side of the bay, just N of Millecoquins Point. A former lumber dock on the N side of the point has washed out except for a few piles. Good shelter for craft drawing up to 10 feet is behind the small point just NE of Millecoquins Point, but the approach is rendered dangerous by the shoals E of Millecoquins Point. A small-craft harbor developed by the Michigan State Waterways Commission on the NE side of Millecoquins Point is protected by a breakwater. Transient berths, gasoline, water, electricity, sewage pump-out facilities, and a launching ramp are available.

From Biddle Point E for 9 miles to **Point Epoufette** (46°02.8'N., 85°11.7'W.), the shore is irregular and rocks and shoals extend 3 miles offshore in the bight just E of Biddle Point decreasing to 1 mile offshore just W of Point Epoufette. **Pelkie Reef,** with a depth of 11 feet at the N end and a rock awash at the S end, is 1.7 miles offshore 2.7 miles SW of Point Epoufette. A detached boulder ledge, covered 6 feet, is 1.5 miles WSW of Pelkie Reef. A 14-foot spot is 3 miles W of Pelkie Reef. Detached 16- and 17-foot spots are 1.1 miles SSW and 0.9 mile S of Point Epoufette, respectively.

Charts 14880, 14911, 14881.–From Point Epoufette, the shore bends SE for 17 miles to **Point aux Chenes** (45°55.5'N., 84°54.6'W.). The shoal border reaches an extent of 1.8 miles about 4 miles E of Point Epoufette, thence decreases to 0.2 mile wide 3 miles N of Point aux Chenes. At Point aux Chenes, shoals and boulders, covered less than 18 feet, reach 1.5 miles W and 2.5 miles NW.

About 4.5 miles SE of Point Epoufette, a privately dredged channel, with a controlling depth of 24 feet in 1978, leads from deep water in Lake Michigan E to a private harbor of Sand Products Corp.

Manitou Paymen Shoal, with depths of 1 to 10 feet and a dangerous rock awash at the center, is 4 miles offshore, 8 miles SE of Point Epoufette. A buoy marks the S side of the shoal. A boulder, covered 18 feet, is 0.9 mile SSE of the buoy.

Between Point aux Chenes and **Gros Cap,** 5.7 miles SE, the shore is indented by small bays with shallow depths and rocks, awash and submerged. A boulder ledge, with a least depth of 17 feet, is 2.2 miles S of Point aux Chenes. **West Moran Bay,** on the SE side of Gros Cap, affords protection for small craft from N to E winds.

St. Helena Island, 2 miles SW of Gros Cap, is marked by a light on the SE end. Shoals extend about 0.3 mile off the NW, SW, and SE sides of the island. A buoy marks the SE edge of the shoals. Approaching from the W, the island should be given a wide berth.

St. Helena Shoal, 2 miles W of St. Helena Island, is 1.3 miles long E and W and has a least depth of 4 feet. A buoy marks the SW side of the shoal. Do not attempt to round the NW end of St. Helena Island at night unless its appearance under Gros Cap and the position of St. Helena Shoal are well understood.

From West Moran Bay SE for 2.5 miles to Point La Barbe, shoals extend about 1 mile offshore. **Point La Barbe** is the SW point of Point St. Ignace, which forms the S side of the Straits of Mackinac. **Green Island** and several small islets are on the shoal bank off Point La Barbe.

Mackinac Bridge crosses the Straits of Mackinac between Point St. Ignace on the N and Mackinaw City on the S. The center span of the suspension bridge has a clearance of 148 feet at the center decreasing to 135 feet at each end. The approaches to the bridge are marked by lighted and unlighted buoys. A private fog signal is under the main bridge span on the channel line. (Mackinac Bridge is described more completely at the beginning of this chapter.)

Currents.–Currents in the Straits of Mackinac, particularly NE of Mackinac Bridge in the vicinity of the Graham Shoals, are often strong and irregular.

The Straits of Mackinac E of Mackinac Bridge are described in chapter 10.

12. ST. MARYS RIVER

Depths and vertical clearances given in this chapter are referred to the sloping surface of the river above the locks when Lake Superior is at Low Water Datum, elevation 600.0 feet, and the gage above the U.S. locks reads 599.5 feet, and below the locks when the gage below the U.S. locks reads 577.8 feet and Lake Huron is at Low Water Datum, 576.8 feet. These elevations are above mean water level at Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955).

Charts 14882, 14883, 14884.–St. Marys River forms the outlet of Lake Superior, connecting it with Lake Huron. From **Whitefish Bay** at the SE corner of Lake Superior, the river flows in a general SE direction to empty into Lake Huron at Point De Tour, a distance of 63 to 75 miles depending on the route traveled. The river is bounded on the W side for its entire length by the E end of the upper peninsula of Michigan and on the E side by the Ontario mainland in the upper part and **Drummond Island** and **St. Joseph Island** in the lower part.

De Tour Passage, at the mouth of the river, extends N from Lake Huron. The W side of the passage extends from **Point De Tour** to **Gaffney Point,** 4 miles N, and the E side extends from **Barbed Point** to **Black Rock Point,** 3 miles N.

After passing through De Tour Passage, the river turns NW and widens. Between Black Rock Point and the S end of St. Joseph Island, the river extends across the mouth of Potagannissing Bay. From **Old Fort St. Joe Point** at the S end, the river extends along the W side of St. Joseph Island for about 19 miles to **Stribling Point** at the N end. About 3 miles NW of Old Fort St. Joe Point, the river narrows between **Hay Point** and **Point aux Frenes. Munuscong Lake** is the widening in the river between Point aux Frenes and the foot of Neebish Island, about 8 miles N.

Neebish Island, about 8 miles long and 4 miles wide, is in midriver opposite the N end of St. Joseph Island. Narrow channels lead around either side of the island. **Sugar Island,** just N of Neebish Island, is about 15 miles long N and S and has a maximum width of about 8 miles at the N end. **Lake George** separates the E side of the island from the Ontario mainland, and **Lake Nicolet,** through which flows the main channel of the river, is W of the island. A narrow channel leads from the N end of Lake George around the N end of Sugar Island and joins with the channel that leads N from Lake Nicolet.

From the junction, the river extends 2 miles W between the cities of Sault Ste. Marie in Michigan and Ontario to **St. Marys Falls** and the canals and locks which overcome them. Above the locks, the river extends 5 miles SW to the narrows between **Pointe aux Pins** and **Brush Point,** thence W for 3 miles before turning NW around **Pointe aux Chenes** and extending about 5 miles to the head of the river in Whitefish Bay.

Channels.–A series of dredged deep-draft channels lead through the St. Marys River to connect the deep water of Lake Huron with that of Lake Superior. A detailed description of the various channel reaches is given later in the chapter. These channels are well marked by lighted and unlighted buoys and lighted ranges.

Throughout much of the river, dumping grounds for dredging spoils are close outside the dredged channels and may be very shoal or in the form of small islands. These areas must be avoided.

Limiting Dimensions (in feet) of Through Channel:

In MacArthur Lock–length, 800; width, 80; depth, *31.

In Poe Lock–length, 1,200; width, 110; depth *32.

In Davis and Sabin Locks–length, 1,350; width, 80; depth, 23.

In Canadian Lock–length, 900; width, 59; depth, 16.

In improved river channels:

Upbound (westerly side)–width, 300; depth, 27.
Upbound (easterly side)–width, 200; depth, 21.
Downbound–width, 300; depth, 27.

*Governing depth in South Canal approaches to lock is 27½ feet.

Note.–The depths given in this chapter for the improved dredged channels in the St. Marys River are the Federal project depths. The Corps of Engineers makes periodic bar sweeps through all the improved dredged reaches of the St. Marys River, and these channels are well maintained at the project depths. Any depths found to be less than the project depths are published in the Local Notice to Mariners.

Fluctuations of water level.–Each year the St. Marys River rises and falls about 1 foot as measured by the monthly mean levels. Since 1900, the difference between the highest and the lowest monthly mean levels above the locks has been about 4 feet and below the locks about 6 feet. From day to day, the level fluctuates somewhat due to changes of wind and barometric pressure; such fluctuations frequently amount to several inches and sometimes to 1 foot or more. In addition to these changes in level, barometric pressure changes occasionally cause a considerable oscillation to take place within a short period; such changes amounting to over 5 feet have been known to occur within 3 hours. As much of the present sailing route in the St. Marys River has been made navigable by dredging, the changes in level have a direct effect on the available depth.

Currents.–As the speed limits established for the

St. Marys River in **33 CFR 161.880 and 161.886**, chapter 2, refer to the speeds over the bottom, and as the currents in the river are variable, masters are cautioned to regulate the speed of their vessels by running on time from point to point instead of relying on the number of revolutions per minute of the propeller.

The swiftest currents in the navigable channels of the St. Marys River are found at Little Rapids cut (course 2), West Neebish Channel Light 29, Six Mile Point, and West Neebish Channel rock cut (course 6). The strength of the current depends largely upon the discharge of the river and the elevation of the water surface at the mouth of the river. The discharge of the river is now under control and is varied according to water-level requirements. When the water surface at the upper end of Lake Huron is high, because of E or S winds or because of barometric variations, the current velocity is temporarily checked. When the stage on Lake Superior is such that a large flow is being permitted, the current is strong and is further increased if the level of Lake Huron is low.

The attention of masters is also directed to the fact that at times the current over the rapids at Sault Ste. Marie is slight, while a very strong set is often experienced when passing the inlets of both the Michigan and Ontario power canals, adjacent S and N of the locks at Sault Ste. Marie, respectively. This is especially true of the Ontario canal where vessel masters have encountered difficulty through attaching too much importance to the rapid's current and not enough to that of the power canal.

It is well to note that E and S winds make high water below the locks and low water above the locks and that W and N winds have the opposite effect.

Currents for the following locations in the St. Marys River are given at high water flow of 110,000 cubic feet per second (cfs), medium water flow of 76,000 cfs, and low water flow of 57,000 cfs, respectively.

Little Rapids cut (course 2): 2.2 mph (2.0 knots), 1.6 mph (1.4 knots), and 1.4 mph (1.2 knots)

West Neebish Channel Light 29: 1.8 mph (1.6 knots), 1.3 mph (1.1 knots), and 1.0 mph (0.9 knots)

Six Mile Point: 1.6 mph (1.4 knots), 1.1 mph (1.0 knots), and 1.0 mph (0.8 knots)

West Neebish Channel rock cut (course 6): 1.5 mph (1.3 knots), 1.1 mph (0.9 knots), and 0.8 mph (0.7 knots)

Middle Neebish Channel dike (course 6): 1.4 mph (1.2 knots), 1.0 mph (0.9 knots), and 0.9 mph (0.8 knots).

Ice.–The upper and lower parts of the St. Marys River reach average ice thicknesses of 14 and 17 inches and average maximum thicknesses of 20 and 26 inches, respectively. The river is not much affected by wind, and the channel track remains well defined with a stable ice sheet outside the channel. Broken pieces of ice accumulate in the channels and may become concentrated in some bottleneck areas. In some reaches, brash ice may accumulate up to 4 feet thick around mid-January. (See Winter Navigation, chapter 3.)

A Vessel Traffic Service (St. Marys River), operated by the U.S. Coast Guard, has been established for St. Marys River and lower Whitefish Bay from De Tour Reef Light to Ile Parisienne Light, except for the waters of the St. Marys Falls Canal. The Service is designed to prevent collisions and groundings and to protect the navigable waters concerned from environmental harm resulting from such collisions or groundings.

The Vessel Traffic Service provides for a Vessel Traffic Center (VTC), that may regulate the routing and movement of vessels by movement reports of vessels, specific reporting points, and VHF-FM radio communications. The Service includes one- and two-way traffic areas, areas of allowed and prohibited anchorage, and speed limits.

The Vessel Traffic Center, call sign "Soo Control," is operated continuously, and maintains radiotelephone communications with vessels on VHF-FM channel 16 (156.80 MHz) and channel 12 (156.60 MHz).

Participation in the Service is mandatory for certain vessels. (See **33 CFR 161.801**, chapter 2, for classes of vessels affected.)

This Service is intended in no way to relieve any person of complying with the navigation rules for harbors, rivers, and inland waters generally; the Inland Navigation Rules; Vessel Bridge-to-Bridge Radiotelephone Regulations; the Federal Boating Safety Act of 1971, or any other law or regulation.

See St. Marys Falls Canal, this chapter, for procedures and regulations affecting vessel operations approaching and traversing St. Marys Falls Canal.

The initial reporting point for upbound vessels is abeam De Tour Reef Light; for downbound vessels, abeam Ile Parisienne Light in Whitefish Bay. Permanent reporting points have been established throughout the waterway. Temporary or seasonal reporting points are established as conditions dictate. (See **33 CFR 161.801 through 161.894**, chapter 2, for rules affecting vessel operations in the Vessel Traffic Service.)

Pilotage.–The waters of St. Marys River, bounded at the lower end by latitude 45°59′N., and at the upper end by longitude 84°33′W., are Great Lakes designated waters. Registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot. Registered pilots for the St. Marys River are supplied by Upper Great Lakes Pilots, Inc. (See appendix for address.) Pilot exchange points are at the lower entrance to the river off De Tour, Mich., and at the upper entrance to the river about 3.5 miles SE of Point Iroquois. The pilot boat at De Tour, LINDA JEAN, has a green hull and a white cabin. The pilot boat at the head of the river, J. P. IX, docks just above the locks at Sault Ste. Marie. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

Chart 14882.–**De Tour Passage** forms the mouth, or S end, of St. Marys River. The passage has deep water for a width of over 2,500 feet between the E end of the upper peninsula of Michigan on the W and the W end of Drummond Island on the E. The shoals that border the passage are well marked.

De Tour Reef, a rocky ledge covered 15 feet, is 0.7 mile SE of **Point De Tour** on the W side of the entrance to De Tour Passage. **De Tour Reef Light** (45°57.0′N., 83°54.2′W.), 74 feet above the water, is shown from a white square tower on a concrete crib on De Tour Reef; a fog signal, a radiobeacon, and a radar transponder beacon (Racon) are at the light. (See Racons, chapter 1, for additional information.)

De Tour Shoal, 0.8 mile N of De Tour Reef, is marked on the E side by a buoy that marks the W edge of the deep water through the passage.

Crab Island Shoal, with boulders just below the surface, is on the E side of the passage, 1.3 miles E of Point De Tour. A lighted bell buoy marks the W edge of the shoal. Adjacent W of the buoy, De Tour Passage has been dredged to a depth of 30 feet.

Frying Pan Shoal, boulders covered 18 feet, extends about 0.25 mile from shore on the W side of the passage 2.2 miles N of De Tour Reef Light. **Frying Pan Island,** 0.3 mile N of Frying Pan Shoal, is marked on the E side by a light. An abandoned fueling dock on the SE side of the island has a depth of about 21 feet alongside.

De Tour Village, Mich., is on the W side of De Tour Passage NW of Frying Pan Island. A ferry for passengers, autos, and limited freight operates year round from the village across the passage to Drummond Island. A boatyard 1,500 feet NW of Frying Pan Island Light makes complete hull and engine repairs. Small craft landing at De Tour Village must take care to avoid submerged cribs and dock ruins. In 1982, a small-craft harbor protected by a breakwater was under construction about 400 yards N of the ferry pier. The breakwater is marked by a light on its S end. De Tour Village is a **customs station.**

The W shore of Drummond Island fronts De Tour Passage from **Barbed Point** N for 3 miles to **Black Rock Point.** Dolomite is shipped from an 800-foot dock of Drummond Dolomite, Inc., 1.3 miles N of Barbed Point. The dock has a deck height of 10 feet and reported depths of 23 feet alongside. A conveyor system can load vessels at 4,000 tons per hour. Buoys mark shoals N and S of the dock.

Gaffney Point (46°00.7′N., 83°54.5′W.) is on the W side of De Tour Passage 1.4 miles N of De Tour Village. **Watson Reefs** is a narrow shoal about 0.2 mile offshore between Gaffney Point and the village. Buoys mark the NE and SE sides of the shoal, and a light is near the center. **Pipe Island,** marked on the SW side by a light, is 0.6 mile NE of Gaffney Point. A buoy marks the extent of shoals SW of the island. **Pipe Island Twins** is a pair of small islands about 0.5 mile NE of Pipe Island with shoals between. The E island is marked at the N end by a light, and shoals that extend N from the light are marked by a buoy. **Pipe Island Shoal,** with a least depth of 11 feet, is 0.5 mile SE of Pipe Island. A lighted buoy marks the SE side of the shoal.

Squaw Island, marked at the S end by a light, is 1.4 miles N of Pipe Island. Detached 18- and 22-foot spots are 0.3 and 0.6 mile WNW of Squaw Island, respectively.

A coaling station of the De Tour Dock Co. is at a 1,000-foot wharf 0.6 mile NW of Gaffney Point. The reported controlling depth is 26 feet along the lower 700 feet of the wharf face. A shoal with a least depth of 22 feet is about 400 feet NE of the face.

Sweets Point is about 2 miles NW of Gaffney Point. Shoals extend about 0.6 mile N from the point and are marked near the outer end by a light.

Raber Point (46°04.0′N., 84°01.9′W.), 7 miles NW of Gaffney Point, is the S entrance point to **Raber Bay. Lime Island** is in the middle of the river, 1.7 miles NE of Raber Point. The Lake Coal Division, Consolidation Coal Co., operates an 800-foot wharf on the W side of Lime Island. The wharf, marked at its S end by a light, has least depths of about 17 feet along the upper 300 feet and 25 feet along the lower 500 feet.

At the N end of De Tour Passage, the upbound and downbound vessel channels are divided by the Pipe Island group. The upbound channel leads N on the E side of Pipe Island Shoal. Abreast Pipe Island Twins Light, the channel turns NW, leads S of Squaw Island, and rejoins the downbound channel N of Sweets Point. **Pipe Island Course,** downbound, leads SE from Sweets Point between Gaffney Point and Pipe Island to the N end of De Tour Passage. These channels have a depth of 29 feet.

Lime Island Channel, upbound and downbound, leads NW from Sweets Point to the turn between Raber Point and Lime Island and has a depth of 29 feet. At the turn, a lighted midchannel buoy separates the two-way traffic.

Round Island Course, upbound and downbound, leads N from the turn at the upper end of Lime Island Channel for 3.5 miles to the turn between Point aux Frenes and Hay Point. The depth in the channel is 28 feet. **Round Island,** marked by a light, is on the W side of the channel near its midlength.

Point aux Frenes (46°07.9′N., 84°01.7′W.) is on the W side of the river at the turn from Round Island Course into Munuscong Lake. Lights mark the course changes in the turn.

Charts 14882, 14883.–Munuscong Lake is a widening in St. Marys River from Point aux Frenes upstream to Neebish Island. **Lower Course 8,** upbound and downbound, leads from the turn at Point aux Frenes NW for 4.6 miles through Munuscong Lake. The depth in the channel is 28 feet. The channel is marked at the lower end by a **128°** lighted range on **Hay Point.**

Chart 14883.–Near the middle of Munuscong Lake, at the upper end of Lower Course 8, the dredged channel of the St. Marys River divides to lead around either side of **Neebish Island.** The upbound channel leads generally N between the E side of Neebish Island and St. Joseph Island, thence WNW between the N side of Neebish Island and the

S end of **Sugar Island,** thence N again in Lake Nicolet to the junction with the downbound channel. The channel is about 17.5 miles long between the junctions with the downbound channel. The courses through this stretch are well marked by lighted and unlighted buoys and ranges.

Course 10, marked by a **321°** lighted range on the S end of Neebish Island, leads NW for 2.1 miles from the junction with the downbound channel at the upper end of Lower Course 8. The channel has a depth of 27 feet for a least width of 500 feet.

Course 9 leads 3.6 miles NNE to **Johnson Point** on the SE side of Neebish Island. The E side of the channel has a depth of 21 feet for a width of 200 feet. The W side has a depth of 27 feet for a least width of 300 feet. The W side of the channel is marked by a **016°55′** lighted range at the upper end, and the E side is marked by an unlighted range. An L-shaped Government wharf NW of the front range light has a 46-foot face with 8 feet alongside.

Course 8 leads NW for 1 mile from Johnson Point to **Mirre Point.** The NE side of the channel has a depth of 21 feet for a width of 400 feet, and the SW side has a depth of 28 feet for a least width of 600 feet. The deep side of the channel is marked by a **134°56′** lighted range at the lower end and a **314°** lighted range at the upper end.

Course 7, Munuscong Channel, leads N for 3.2 miles from Mirre Point to **Stribling Point** (46°18.8′N., 84°06.9′W.), the NW point of St. Joseph Island. The E side of the channel has a depth of 21 feet for a width of 200 feet, and the W side has a depth of 27 feet for a least width of 300 feet. The E side of the channel is marked by a **176½°** range at the lower end and a **357°** range at the upper end. The deep side is marked by a **177½°** lighted range at the lower end and a **357°** lighted range at the upper end.

At the turn from the upper end of Course 7 into Course 6, a passage leads NE between Stribling Point and **Harwood Point,** the SE point of Sugar Island, to connect with St. Joseph Channel and the channel that leads N to Lake George. **St. Joseph Channel** separates St. Joseph Island from the mainland and leads E to connect with North Channel. (Several localities in St. Joseph Channel are described in chapter 10.)

Lake George separates the E side of Sugar Island from the Ontario mainland. A channel, well marked by lighted and unlighted buoys, leads N from Harwood Point to the lake, and thence from the N end of the lake around the N side of Sugar Island to connect with St. Marys River at Sault Ste. Marie. The channel has a depth of about 10 feet.

Course 6, Middle Neebish Channel, leads WNW for 3.2 miles from Stribling Point between the N side of Neebish Island and the S side of Sugar Island to the lower end of **Lake Nicolet.** The N side of the channel has a depth of 21 feet for a least width of 200 feet and is marked at the lower end by a **112°** range. The S side of the channel has a depth of 28 feet for a least width of 300 feet and is marked at the lower end by a **111°55′** lighted range and at the upper end by a **292°** lighted range. A dike, marked at the center and ends by lights, borders the N side of the channel for 1.2 miles near midlength of the course. The range structures at the upper end of the course are in the open water of Lake Nicolet. They are well protected with riprap and should not be passed close aboard.

Course 5 leads NW from the lower end of Lake Nicolet for about 4.5 miles to the junction with the downbound channel near midlake. The E side of the channel has a depth of 21 feet for a width of 200 feet and is marked at the lower end by a **150¼°** range. The W side of the channel has a depth of 27 feet for a least width of 300 feet and is marked at the lower end by a **150°** lighted range.

West Neebish Channel, downbound, diverges from the upbound channel near the middle of Lake Nicolet and leads generally S for about 16.5 miles between the W side of Neebish Island and the mainland to the lower junction with the upbound channel S of Neebish Island in Munuscong Lake. The courses through this stretch are well marked by lighted and unlighted buoys, lights, and lighted ranges.

Course 4 is a continuation of the downbound portion of Course 4, upbound and downbound, which leads through the middle of Lake Nicolet. From the junction with the upbound channel, Course 4 leads SSE for 2.5 miles to the lower part of the lake. The channel has a depth of 27½ feet and is marked by a **160°** lighted range.

Course 5 leads S from the lower part of Lake Nicolet for 4.4 miles to the rock cut on the W side of Neebish Island. The channel has a depth of 27½ feet and is marked by a **181°30′** lighted range.

Course 6 leads SE from the head of the rock cut for 2.7 miles to a point about 0.5 mile N of **Sawmill Point.** The upper part of this course, through the cut, is bordered on either side by a vertical rock masonry wall marked by lights. A fog signal on the W side of the entrance to the cut is operated only on request to the Coast Guard vessel traffic control center, Soo Control. The channel has a depth of 28½ feet and is marked at the lower end by a leading light.

Course 7 leads S from the turn 0.5 mile N of Sawmill Point for 2.4 miles to **Moon Island.** The channel has a depth of 28½ feet and is marked by a leading light on the N end of Moon Island.

Course 8 leads SE from Moon Island for 4.6 miles through the upper part of Munuscong Lake to the junction with the upbound channel S of Neebish Island. The channel has a depth of 27½ feet.

Course 4, upbound and downbound, leads through the middle part of Lake Nicolet from the vicinity of **Ninemile Point** (46°23.6′N., 84°13.7′W.) NNW for 3.5 miles to **Six Mile Point.** The channel has a depth of 29 feet for a width of 1,500 feet. The upbound, E, side of the channel is marked by a **339½°** lighted range, and the downbound side is marked by a **160°** lighted range at the S end of Lake Nicolet.

An **anchorage,** with a depth of 28 feet and marked by buoys, is adjacent to the downbound side of Course 4 opposite Ninemile Point.

Charts 14883, 14884.–Course 3 and Course 2, Little Rapids Cut, lead NNW from Six Mile Point for about 4.5 miles to the turn above Mission Point. The channel has a depth of 27 feet for a least width of 600 feet. A leading light on the W side of Sugar Island marks Course 3 downbound, and a **323°20'** lighted range at **Frechette Point** (46°27.5'N., 84°16.9'W.) marks Course 3 upbound. A **153°** lighted range at Six Mile Point marks Course 2 downbound.

A small-craft channel marked by buoys leads NW from Course 2 on the N side of Frechette Point between the mainland and a group of small islands. There is no access from this channel at its upper end of the main channel. Marinas on the mainland side of this channel provide transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, a launching ramp, an 8-ton marine railway, and minor repairs.

Mission Point (46°29.2'N., 84°18.2'W.), marked by a light, is on the W side of the river just below the turn at the upper end of Course 2. A ferry operates across the river from Mission Point to **Island No. 1.**

In September 1981, two ice stabilization islands were under construction on the SW side of the river about 0.3 and 0.45 mile above Light 99; caution is advised.

In December 1981, a submerged obstruction was reported in about 46°29'10"N., 84°18'08"W., about 100 feet off the ferry dock.

Chart 14884.–At the upper end of Course 2, Course 1, **Bayfield Channel,** turns WNW in the approach to St. Marys Falls Canal. The channel has a depth of 28 feet W to the outer end of East Center Pier of the canal and is marked at the lower end by a **109°** lighted range. **Bayfield Dike,** marked by a light, parallels the N channel limit about 1 mile NW of Mission Point. W of the dike, the N channel limit is marked by lighted buoys.

St. Marys Falls, the rapids of St. Marys River, are about 14 miles below the head of the river at Point Iroquois and about 3 miles above Mission Point. The rapids are about 0.8 mile long and 0.3 mile wide, with a fall of 18 to 24 feet depending on the varying water stages. The U.S. Government has constructed canals and locks to overcome these rapids.

St. Marys Falls Canal, 1.9 miles long between the upper and lower entrances, is along the S side of St. Marys River abreast the falls. The canal comprises North Canal and South Canal, separated by a center pier and each having two locks. The canals are faced with revetment walls and piers of timber, steel, and concrete. The outer ends of the N, S, and center piers at the canal entrances are marked by lights. The downbound approach to the canal is marked by a **076°** lighted range.

South Canal, with a least width of 304 feet, has a depth of 27½ feet in the E entrance and 28 feet in the W entrance. **MacArthur Lock,** near the lower end of the canal, is 800 feet long, 80 feet wide, and has a depth of 31 feet. **Poe Lock,** immediately N of MacArthur Lock, is 1,200 feet long, 110 feet wide, and has a depth of 32 feet. In June 1982, the controlling depth in the W approach to MacArthur Lock was 28 feet.

North Canal, with a least width of 282 feet, is limited by the locks to a depth of 23.1 feet. **Davis Lock,** N of Poe Lock, is 1,350 feet long, 80 feet wide, and has a depth of 23.1 feet. **Sabin Lock,** paralleling the N side of Davis Lock, has the same dimensions.

Communications.–The chief lockmaster operates a vessel dispatch station from the administration building on the pier between Poe and MacArthur Locks. The station operates on VHF-FM channels 14 (156.70 MHz) and 16 (156.80 MHz); call sign, WUD-31. The voice call for the station is WUD-31 or Soo Locks. Upbound vessels intending to transit the locks shall contact the lockmaster initially at Ninemile Point, then at Bayfield Dike Light for lock assignment. Downbound vessels shall make initial contact at Ile Parisienne, then at Big Point for lock assignment. In order that the dispatch made will cause the least delay to the vessel involved, vessel masters are requested to refrain from making their dispatch calls prior to reaching the above locations. This station is considered to have an effective operating range of about 50 miles. Operation is limited to communication with vessels on matters related to canal operation, traffic movement through the locks, and for emergency purposes. Masters are urged to provide supervision of the vessel's radiotelephone when approaching and transiting the canals so as to be promptly advised of changes in lock dispatch, impending bridge closures, etc. Vessels requiring special services while in the locks should contact the station in advance to expedite necessary arrangements by canal authorities.

Lock signals.–Upbound signals consisting of two lights, one red and one green, facing E, are on the SE wall ends of each lock to indicate to upbound vessels when it is safe to proceed into lock chambers. These signals are normally set to show red and are changed to green only when it is safe and permissible for each individual vessel to enter the lock. Vessel masters are cautioned not to enter a lock chamber upbound except on a green light signal, even though the lock gates may be open.

In order that masters of downbound vessels approaching the NW pier may know when either the Davis or the Sabin Lock is filling, three signals have been established. These consist of flashing yellow lights, one placed on top of a light pole at the end of the upper nose pier between these two locks, the second at a point about 100 feet upstream of the railroad bridge on the NW pier, and the third on top of a light pole about midway between the railroad bridge and the end of the NW pier. The lights flash during the first 8 minutes of each lock filling, which is the period when flow toward the lock is increasing. In order that masters of downbound vessels approaching the SW or W center piers may know when either the MacArthur or the Poe Lock is filling, a signal consisting of a flashing yellow light is mounted on the top of a light pole at the end of the nose pier between the MacArthur and Poe Locks.

The light flashes during the period when either lock is filling.

Upbound vessels approaching the E center pier are cautioned against landing too close to its outer end because of eddy currents. When the N locks are being emptied, an eddy moving upstream is formed along the SE pier. When the S locks are being emptied, the current at the end of the center pier flows N. When the N locks are emptying, this latter current is usually reversed. Wind conditions alter the situation.

A current sets across the end of the W center pier during the filling of the locks. The current can set in either direction depending on conditions. Vessels bound for Davis Lock should not attempt to make the pier near its end.

Downbound vessels dispatched to MacArthur Lock are cautioned to hold on Vidal Shoals Channel Range until N of the light on SW pierhead. Due to the strong current that sets into the power company canal adjacent to the end of the SW pier, such vessels should pass at least 200 feet N of the end of the pier. A light is about 1,000 feet E of the outer end of SW pier; vessels should land E of the light.

Before entering a lock, all vessels shall put heaving lines, attached to forward and aft cables, out onto the approach pier, and either line or cable shall be continuously carried by the vessel deckhands or canal linesmen until the vessel is moored in the lock chamber in all cases where the mooring is made on the side of the lock adjacent to the approach pier used. Vessels intending to moor on the side of the lock opposite that adjacent to the approach pier shall, in the same manner, put out heaving lines and have the line or cable continuously carried along the approach pier, shall take them in just as the lock is entered, and put them out again on the mooring side of the lock as soon as possible.

Regulations.–The use, administration, and navigation of St. Marys Falls Canal and locks are under the direction of the District Engineer, U.S. Army Corps of Engineers, Detroit District. (See **33 CFR 207.440 and 207.441,** chapter 2, for regulations.) Copies of the regulations and the vessel transit forms required in **207.440(k)** are available at the U.S. Canal Office in the operations building adjacent to Davis Lock. A notary public and a **marine post office,** designated Canal Station, are in the operations building.

Upbound recreational small craft desiring lockage shall report to the small-craft dispatch station near the outer end of E center pier. Downbound recreational craft shall report to the dispatch station on SW pier. Rowboats and canoes are prohibited. All craft must have power and an auxiliary movement source such as oars, a life jacket for each person on board, 75 feet of line to reach the top of the lock wall, and lock report forms available at the dispatch station.

Whenever, in the opinion of the Detroit District Engineer or his authorized representatives at St. Marys Falls Canal, the safety of lock structures or vessels in the canal area might be jeopardized by the continuance of vessel movements during periods of low visibility, all vessel movements in the canal area, and in approaching and entering the canal area, may be stopped. Whenever the stopping of vessel movements becomes advisable, the U.S. Coast Guard will be informed and will take such usual action as is necessary to advise vessels approaching St. Marys Falls Canal and to direct their anchoring. The chief lockmaster in the control tower at St. Marys Falls will personally direct, by radiotelephone, all movements of vessels in the locks area at the time the stop order is issued, and may approve continued movement or order mooring at specified locations.

Sault Ste. Marie (Canada) Canal is on the N side of St. Marys River parallel to St. Marys Falls Canal. The canal, about 1.2 miles long, is cut from solid rock and has a general width of 150 feet at the top and 141 feet at the bottom. The upbound approach to the canal leads NW from Bayfield Channel and has depths of 18 to 20 feet. The approach is marked by buoys and a **322°30'** lighted range, and the outer ends of the canal piers are marked by lights. The downbound approach to the canal leads NE from Vidal Shoals and has a depth of about 22 feet. The channel is marked by buoys and a **050°48'** lighted range, and the outer ends of the canal piers are marked by lights. The SE side of the turn from the rangeline into the canal entrance is marked by a lighted buoy. In November 1982, shoaling to 20 feet was reported in the channel between Vidal Shoals Southwest Lighted Buoy B and Vidal Shoals West Lighted Buoy 24.

Caution.–Currents in the area of Vidal Shoals can be quite strong, depending on the number of sluice gates open in the power canals and over the falls. Vessels must guard against being set down on the shoals.

Strong crosscurrents exist at the upper entrance to Sault Ste. Marie (Canada) Canal caused by the flow into the power canal on the N side of the lock canal. Vessels have experienced difficulty by attaching too much importance to the rapids current and not enough to that of the power canal.

The lock near the E end of the Canadian canal has a usable length of 852 feet. The lock is available for transit by vessels to 777 feet long, 59 feet wide, and with drafts of 18 to 21 feet. The vessel traffic control station should be contacted for information on permissible draft. Vessels with structures that extend more than 110 feet above the water must furnish the canal authorities with precise information concerning the vessel height before transiting the canal.

The Canadian lock operates daily between 0700 and 2300 local time. Vessels must be between the piers by 2230 to lock through before the next morning.

Communications.–Sault Ste. Marie (Canada) Canal authorities operate a vessel traffic control station on the N side of the lock. The station operates on VHF-FM channel 16 (156.80 MHz), calling, and channel 14 (156.70 MHz), working; call sign, VDX-23. The voice call for the station is VDX-23 or Canadian Canal.

Vessels intending passage through, or departing from, the Canadian canal shall maintain radiotelephone contact with the canal between Six Mile Point and **Brush Point** (46°28.2'N., 84°27.3'W.). Upbound vessels reaching Six Mile Point shall call the canal on VHF-FM channel 16 (156.80 MHz), and after making contact, shall shift to VHF-FM channel 14 (156.70 MHz) for transit instructions. Downbound vessels shall follow the same procedure upon reaching Brush Point.

If for any reason after contacting the canal, a vessel master changes his mind and decides to transit the U.S. locks, he should immediately advise the Canadian canal. Vessels intending to proceed to a dock above or below the lock should advise the station of their destination. Vessels leaving a dock to proceed to the lock should advise the station of their request for transit one half hour in advance. Vessels departing the lock or the docks should give the customary security calls.

Information on currents, water levels, and permissible drafts are available from the station.

Lock signals.–Vessels approaching the Canadian lock should sound three long and two short blasts about 1,000 feet before entering the canal reach.

Red and green signal lights are at each entrance to the canal, and a third traffic signal is in the W approach about midway along the N approach wall. "Limit of Approach" signs are on the SE pier 425 feet from the lower lock gates and on the NW pier 1,700 feet from the upper lock gates. A steady red light or no light means that an approaching vessel shall stop and make fast before reaching the "Limit of Approach" sign, where the vessel shall wait for a green light. Vessels shall not make fast to the NE or SW piers without prior permission from the lockmaster.

Upon entering the lock, a downbound vessel shall come to a full stop when the bow has reached a point 200 feet from the lower gates, and likewise an upbound vessel shall come to a full stop when the bow has reached a point 200 feet from the upper gates. Stop signs are painted on the lock walls.

When in distress or unable to determine from the lock signal light whether or not to proceed past the entrance piers, a vessel may contact the Canadian Lock, VDX-23, on VHF-FM channel 16 (156.80 MHz) for instructions. Upon making contact, the vessel should switch to a working frequency.

Upbound recreational small craft desiring lockage shall tie up at the bend in the NE pier. The landing is marked by a sign and a blue light. A telephone for obtaining lockage instructions is at the landing. Downbound recreational small craft shall follow the same procedure at the bend in the SW pier.

Small craft transiting the canal must have power and an auxiliary power source such as oars, a 75-foot line to reach the top of the lock wall, and a life jacket for each person on board.

Regulations.–All vessels transiting Sault Ste. Marie (Canada) Canal are governed by regulations established by the Canadian Government and contained in the publication "Heritage Canal Regulations." Copies of the regulations are available from the Canal Marine Post Office or the Canadian Government Publishing Centre. (See appendix for address.)

A **no anchorage area** is at the E entrance to the canal.

The **speed limit** in Canada Canal is 6.9 mph (6 knots) and is subject to specific instructions to a particular vessel.

Bridges.–Two bridges cross the St. Marys Falls and Sault Ste. Marie Canals W of the locks, from Sault Ste. Marie, Mich. to Sault St. Marie, Ont. The International Highway Bridge has 3 fixed spans, with clearances of 124 feet over South Canal and North Canal, and 120 feet over the Canadian canal.

International Railway Bridge parallels the highway bridge close upstream. Across South Canal, the bridge has a vertical lift span with a clearance of 16 feet down and 123 feet up. Across North Canal, the bridge has a double-leaf bascule span with a clearance of 13 feet. The leaves of the bridge do not open to a vertical position. When open, the S leaf overhangs the channel above a height of about 65 feet above normal water level, and the N leaf overhangs the channel above a height of about 68 feet above normal water level. The vertical lift and bascule spans are each equipped with signal lights that show green when the span is completely open and red at all other times. (See **33 CFR 117.1 through 117.59 and 117.653,** chapter 2, for drawbridge regulations.) Across the Canadian canal, the bridge has a swing span with a clearance of 15 feet. The opening signal for the bridge is three long blasts. The bridge sounds no signals, but shows a green light when open and a red light when closed.

Sault Ste. Marie, Mich., a city on the S side of St. Marys River adjacent to St. Marys Falls Canal, is a **customs port of entry.**

Weather.–(See page T-14 for **Sault Ste. Marie climatological table.**)

Towage.–Tugs to 2,250 hp are available at Sault Ste. Marie and operate throughout the river. Arrangements are made through Seaway Towing Company's dispatch office in Sault Ste. Marie at 906-632-8801, 906-635-1394 or 906-297-5111, or Great Lakes Towing Company's dispatch office in Cleveland at 800-321-3663 or via remote VHF-FM antenna.

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Coast Guard.–Sault Ste. Marie Coast Guard Station, Group Office, and Base are close S of the lower entrance to South Canal. A **Captain of the Port** office is at the base. (See appendix for address.)

Communications to the Coast Guard relating to distress and/or communications other than vessel traffic movement are made on VHF-FM channels 16 (156.80 MHz) and 22 (157.10 MHz); voice call, Coast Guard Group Sault Ste. Marie.

Foreign-Trade Zone No. 16 is in Sault Ste. Marie.

(See chapter 1, Foreign-Trade Zones, and appendix for address.)

Repairs.–An 800-ton floating drydock with a length of 110 feet, width of 40 feet, and 14½ feet over the sills is 2,000 feet SSW of Bayfield Dike Light. The yard is equipped with a 25-ton floating crane and a 40-ton shore crane. Hull and engine repairs are available. Above-the-waterline repairs are available at another yard 2,000 feet NW. A 100-ton crane is available.

Sault Ste. Marie, Ont., is a port city and manufacturing center on the N side of St. Marys River adjacent to Sault Ste. Marie (Canada) Canal. The principal commodities handled in the port are coal, iron ore, petroleum products, steel products, and pig iron.

Channels.–From the turn in the upper approach to the Canadian canal, a privately dredged approach channel leads N to the Algoma Steel Corp. slip. In 1978, the reported controlling depths were 24 feet in the approach and 21 feet in the slip.

Towage.–Tugs are available at Sault Ste. Marie from A. B. McLean and Sons Ltd.

Sault Ste. Marie is a **Canadian customs port of entry.**

Wharves.–Algoma Steel Corp. Ltd. receives iron ore, coal, limestone, and oil, and ships steel products from its wharf 1.1 miles WNW of the Canadian lock. The S face is 600 feet long, and the face of the E side of the slip is 2,000 feet long. The berths have reported depths of 21 feet alongside and deck heights of 10 feet. The wharf has tank storage for 900,000 barrels of oil and open storage for 2 million tons of coal and over 2½ million tons of iron ore pellets.

Charts 14962, 14884.–From the St. Marys Falls and Sault Ste. Marie Canals, the upper part of St. Marys River leads SW around Pointe aux Pins, thence NW to its head in the deep water of Whitefish Bay. The dredged channels through this part of the river are well marked by lighted and unlighted buoys and lighted ranges.

Vidal Shoals are in the upper approaches to the United States and Canadian canals. Dredged channels lead through the shoals to the respective canals.

Vidal Shoals Channel, the approach to St. Marys Falls Canal, with a depth of 28 feet, leads ENE from **Big Point** for 2.2 miles to the canal entrance. The channel is marked by **076°** Vidal Shoals Channel Range. Near midlength of this reach, the upper approach to the Canadian canal (previously described) branches NE.

A privately dredged 21-foot channel leads S from Vidal Shoals Channel to a slip at the C. Reiss Coal Co. 1.7 miles WSW of Poe Lock. In 1966, the slip had a controlling depth of 21 feet for a distance of 600 feet. In 1978, the dock was in poor repair.

Pointe aux Pins Course, with a depth of 28 feet, extends from Big Point SW for 2.5 miles to the turn between **Brush Point** and **Pointe aux Pins** (46°28.5′N., 84°27.9′W.). The channel is marked at the upper end by a **233°06′** lighted range.

Pointe Louise Channel leads SSW for 0.8 mile from Pointe aux Pins to **Pointe Louise**, and thence **Pointe Louise Turn** leads SW for 0.5 mile to connect with Brush Point Course. These channels have a depth of 28 feet.

A **Canadian customs vessel reporting station** is at Pointe Louise.

Brush Point Course extends from Pointe Louise Turn SW for 3 miles to the turn SSW of **Pointe aux Chenes** (46°28.6′N., 84°31.6′W.). The channel has a depth of 28 feet and is marked at the lower end by a **074°** lighted range.

At the turn at the upper end of Brush Point Course the dredged channel flares broadly to W. **Birch Point Course** leads NW from the turn for about 4 miles to the deep water in Whitefish Bay and includes dredged cuts through Point Iroquois Shoals and Gros Cap Reefs. The channel has a depth of 30 feet and is marked at the lower end by a **138°30′** lighted range on **Birch Point** (46°26.0′N., 84°31.4′W.). A lighted midchannel buoy is on the range line in the turn.

Waiska Bay, 3 miles W of Birch Point, has depths of 4 to 12 feet and is used mainly by local fishermen. Submerged and partially submerged piles extend in a line across the mouth of the bay, and extreme caution is advised when entering the bay.

Point Iroquois Shoals, with a depth of 15 feet at the outer edge, extend from the shoreline SE of **Point Iroquois** (46°29.1′N., 84°37.8′W.) NE to the edge of the dredged channel through Birch Point Course. Buoys at the outer edge of the shoal mark the limit of the dredged channel.

A buoy 2.9 miles NW of Point Iroquois marks the NE side of a boulder bank covered 24 feet.

Gros Cap Reefs, a rocky bank with a least depth of 17 feet, is on the E side of the entrance to St. Marys River, 2 miles N of Point Iroquois and from 1 to 1.8 miles SW of **Gros Cap**. **Gros Cap Reefs Light** (46°30.7′N., 84°36.9′W.), 45 feet above the water, is shown from a white tower on the S part of the reefs. A fog signal, a radiobeacon, and a radar transponder beacon (Racon) are at the light. (See Racons, chapter 1, for additional information.) A **Canadian customs vessel reporting station** is at a dock on the SE side of Gros Cap.

13. LAKE SUPERIOR

Depths and vertical clearances under overhead cables and bridges given in this chapter are referred to Low Water Datum, which for Lake Superior is an elevation 600.0 feet above mean water level at Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955). (See Chart Datum, chapter 1.)

Dimensions, etc.

Length, steamer track, Duluth Ship Canal to Point Iroquois; about 383 miles.

Length (right line in clear), Duluth Ship Canal to Michipicoten Harbour; 350 miles.

Breadth, on about longitude 86°45'W.; 160 miles.

Depth, maximum recorded; 1,333 feet.

Water surface of lake (including St. Marys River above Brush Point); 20,600 square miles (U.S.), 11,100 square miles (Canada).

Entire drainage basin (including St. Marys River above Brush Point); 37,500 square miles (U.S.), 43,500 square miles (Canada).

General description.–**Lake Superior,** the largest freshwater lake in the world, is the northernmost, westernmost, highest, and deepest of the five Great Lakes. The lake is fed by the waters of many short swift-flowing streams and drains through the St. Marys River into Lake Huron. The shores of the lake are generally high, rocky, and forested. The lake is sparsely populated, especially along the N shore.

The waters of Lake Superior are colder and form more shore ice than do the other lakes. The navigation season, shorter than the other lakes, is generally about 8 months long. The actual length of the season depends primarily on whether tonnage demands justify the expense of ice breaking for earlier or later vessel movements. Commercial fishing operations from harbors around the lake continue throughout the year except where prevented by ice conditions.

Fluctuations of water level.–The normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and fall; the lowest stage is usually reached at about the close of winter and the highest during the late summer.

In addition to the normal seasonal fluctuation, oscillations of irregular amount and duration are also produced by storms. Winds and barometric pressure changes that accompany squalls can produce fluctuations that last at the most a few hours. A storm of this type in 1939 produced fluctuations at Marquette with a maximum range of 7.4 feet. At other times, strong winds of sustained speed and direction can produce fluctuations that last a few hours or a day. These winds drive forward a greater volume of surface water than can be carried off by the lower return currents, thus raising the water level on the lee shore and lowering it on the windward shore. Fluctuations caused by such winds seldom exceed 1 foot above or below the normal level, but may cause changes up to 2 feet. An unusually severe storm in 1905 temporarily raised the water level in Duluth by 2.3 feet.

Through an agreement between the United States and Canada, the water level of Lake Superior is controlled by means of compensating works in St. Marys River. The dikes and sluice gates in the river are operated so as to maintain the monthly mean level of Lake Superior as nearly as possible between elevations 600.5 and 602.0 feet above the mean water level at Pointe-au-Pere (Father Point), Quebec, on International Great Lakes Datum (1955).

Weather.–Strong winds are a threat from fall through spring over the open waters. Late autumn is the worst, when gales blow up to 6 percent of the time. The W part of the lake is least susceptible since it is somewhat sheltered from the strong winds, many of which have a westerly or northerly component. Fall windspeeds of 28 knots or more occur 11 percent of the time in this region compared to 16 to 18 percent elsewhere.

Spring winds are variable, with N through SE winds common in the morning; southwesterlies also appear in the W. Afternoon directions are similar, with the addition of northwesterlies in the E. Gale frequencies drop to 2 percent or less by May; however, some of the highest winds of the year are encountered during this season. Along the shore, it is a volatile time. At many locations, April registers the highest mean windspeed of the year, while speeds of 28 knots or more also reach a peak. At Duluth, they blow up to 3 percent of the time in April, a month in which its highest windspeed of 65 knots (NE) was recorded. Marquette recorded a 79-knot wind during a May thunderstorm. Winds with easterly components are common in the morning; this is most noticeable at Duluth and Sault Ste. Marie. At Marquette northerlies prevail. Afternoon winds often have a westerly component, but northerlies and southerlies are frequent too.

Summer winds are often out of the S through W; this pattern is intruded upon by afternoon northwesterlies in the E. Windspeeds are most often in the 10- to 20-knot range with gales and near gales uncommon. Strong winds are usually associated with occasional thunderstorms. In fact, the highest recorded wind on the lake was 81 knots (northwesterly) in a June thunderstorm. Along the shore the lake-land breeze results in offshore components in the morning reversing themselves during the day. Morning easterlies give way to W through NW winds at Sault Ste. Marie. Marquette's light and variable breezes yield to a N-through-NE flow.

As autumn progresses, winds blow more and more out of the W and N, and windspeeds are on the increase. By October, gales are blowing up to 5 percent of the time in the east and 2 to 4 percent of the time in the W. Onshore, similar changes are occurring. Early autumn onshore-offshore flow gives way to a variety of S through NW winds associated with migratory highs and lows. Speeds of 28 knots or more, while not frequent, are more so than in summer. Sault Ste. Marie recorded a 52-knot northwesterly during November. Winter winds are stronger still and remain mostly out of the S through NW with an increase in northerlies.

Thunderstorms can occur at any time, but they are most likely from April through October, particularly during June, July, and August. Over the open waters, thunderstorms are encountered 1 to 3 percent of the time during the summer months. These thunderstorms are by far most likely in the early morning hours between midnight and 0300 e.s.t.; they occur up to 8 percent of the time during these hours. Minimum activity occurs around midday. The W half of the lake is more vulnerable to thunderstorms than the E half.

Along the shore, thunderstorms occur on 20 to 30 days annually, including 4 to 7 days per month in the summer. Activity is slightly more frequent at Duluth than at other locations. These thunderstorms can occur as isolated single cells or in violent squall lines. They can generate strong gusty winds and hail. On occasion, tornadoes or waterspouts have been associated with these squalls. Winds in thunderstorms have been recorded at around 80 knots; strong winds are most likely in spring and early summer.

The lake is large enough for strong winds from any direction to have sufficient fetch to build up a sea. However, the Keweenaw Peninsula tends to diminish seas generated by easterlies and westerlies in the S part of the lake. Elsewhere, seas of 25 to 30 feet have been encountered.

In spring, seas can be rough but become less so as summer approaches. Waves of 5 feet or more encountered 30 to 40 percent in April drop off 10 to 15 percent by May. Seas of 10 feet or more also crop up less frequently. An even more dramatic calming occurs in June.

Summer seas rarely build to 10 feet or more, 1 percent of the time, and reach 5 to 10 feet about 10 to 15 percent of the time. Thunderstorms can quickly build rough, choppy seas, but the large waves generated when strong winds blow over a long fetch of water are unusual. Wave heights are 2 feet or less about 60 to 70 percent of the time. Rough conditions return in force during autumn.

Seas of 5 feet or more can be expected 20 to 30 percent of the time in September; by November these figures increase by 20 percent. By late fall, seas are running 10 feet or more about 5 to 10 percent of the time, more than double earlier chances. W waters are the least vulnerable, while central and E waters are more susceptible to the strong winds with northerly and westerly components.

Poor visibilities can be encountered during any season. Radiation fog in autumn, ice fog in winter, and advection fog from spring through fall all contribute to restricted visibilities, as do rain and snow.

Over the open waters, April through August and December are the fog-prone months during the navigation season; June and July are the worst. During this 2-month stretch, visibilities of 2 miles or less may be encountered about 10 to 20 percent of the time, while they fall to 0.5 mile or less about 8 to 17 percent of the time. The most vulnerable waters lie between Keweenaw Point and Au Sable Point. While there is a greater tendency towards fog in the early morning hours, it is not as pronounced as it is onshore.

Along the shore, fog is mainly a morning phenomenon, particularly dense fog. While there are seasonal variations, poor visibilities are common throughout the year. They drop to 0.5 mile or less on about 40 to 60 days annually. At a peak these conditions can be expected on about 6 to 7 days per month. This peak occurs during the summer at some locations with advection fog drifting onshore. Marquette experiences this type of fog. When cold air moves across warm water, fog can set in; this happens at Sault Ste. Marie in late summer and autumn. Radiation fog is also a fall problem, but usually lifts by early afternoon. At Duluth, industrial smoke adds to the visibility hazard.

Ice.–The large heat-storage capacity of Lake Superior plus the strong winds, waves, and currents which create a continuing overturning of relatively warm, deep water inhibit an early ice cover.

Whitefish Bay, at the lower end of Lake Superior, is a bottleneck area. The shallow bay forms ice rapidly, and the prevailing W winds jam and pack the lake ice into the area. The ice reaches an average thickness of 14 inches and an average maximum thickness of 22 inches. Windrows are at least 4 feet thick in most winters, and thicknesses of 8 to 9 feet may be reached.

In the N part of Lake Superior, ice begins to form along the shore in late January and early December, but because of the nature of the shoreline, significant fast ice develops only in Nipigon Bay and Black Bay. Through January and early February the lake remains open, with drifting patches of slush and new ice. By late February these patches may extend 40 to 50 miles into the lake from the lee shores and may reach a 70 to 90 percent coverage of medium thickness ice. Some open water is always present in midlake. The drifting ice decays through March and reaches open water by the end of the month. After reaching a thickness of 30 to 35 inches, the fast ice along the shore breaks up by mid-April.

In the W end of Lake Superior, fast ice about 4 to 6 inches thick builds NE from Duluth as far as the Apostle Islands. In navigation areas, ridging and rafting of the ice occurs, and the refrozen brash ice may reach a thickness of 4 feet. The lake may briefly become covered 80 to 90 percent, but strong winds and the associated waves generally compact the thinner ice and stir up warm water, thus reducing the ice coverage to 40 to 50 percent, even in a severe winter.

Fast ice forms in practically all harbors, entrance channels, and bays. In Thunder Bay, the ice reaches an average thickness of 20 to 30 inches through January, February, and March. At Duluth-Superior, ice up to 1 foot thick can form in December depending on the severity of the winter; the average range is 3 to 6 inches. Ice in the harbor reaches an average maximum of 27 inches and, depending on the weather, is in a state of deterioration by mid-April. (See Winter Navigation, chapter 3.)

Local magnetic disturbances.–Local magnetic distrubances are more prevalent on Lake Superior than on the other Great Lakes. Reports from vessel masters show that the strongest disturbances are along the N shore of the lake, that they decrease in intensity as the distance from this shore increases, and that the tendency is for upbound vessels to be drawn toward the N shore. The disturbances are described in this chapter with the discussion of their locale.

The directive force of the earth's magnetism is rather weak in this region as compared with other navigable waters of the world, and this tends to make the compass needle rather sluggish. Vessel masters should given proper attention to the correction of the compass and the determination of the ship's deviation.

Routes.–The Lake Carriers' Association and the Dominion Marine Association have prescribed, for vessels enrolled in the associations, the following separation of routes for upbound and downbound traffic in Lake Superior:

Downbound vessels shall lay a course from Duluth-Superior Harbor to pass not less than 12 miles off Devils Island Light, Eagle Harbor Light, Copper Harbor Light, and Manitou Light; thence to a point not less than 2.5 miles off Whitefish Point Light; thence head 147½° to a point 2.5 miles off Ile Parisienne Light and thence 138 ¾° to off Gros Cap Reef Light; Provided, That vessels leaving Superior Harbor shall lay their course 045° for 20 miles before turning on the course for Devils Island.

Downbound vessels from Two Harbors shall lay a course of 068° to a position 12 miles N of Devils Island, thence join the general downbound course.

Downbound vessels from Taconite Harbor shall steer 086° to a point 12 miles N of Eagle Harbor, and there join the general downbound course.

Downbound vessels from Silver Bay shall steer 080° to a point 12 miles N of Eagle Harbor, and there join the general downbound course on Lake Superior.

Downbound vessels from Ashland shall lay a course from South Channel to intersect the downbound course from Duluth 12 miles N of Eagle Harbor Light.

Downbound vessels from Marquette shall take departure from a point 076°, 2 miles, from Presque Isle Harbor Breakwater Light, and shall lay a course to pass not less than 7 miles off Au Sable Light, thence to pass not less than 7 miles off Crisp Point Light and continue same course to intersect the downbound course from Manitou to Whitefish Point. The foregoing may be accomplished from Presque Isle Harbor by laying a course of 076½° from Presque Isle Harbor Breakwater Light, and from Marquette by steering 030° for 3.75 miles to above point of departure, thence laying the 076½° course.

Downbound vessels from Thunder Bay, Kaministiquia River entrance, shall take departure from a point not more than 0.5 mile 047° from Welcome Island Light, and shall lay a course 137° for 9 miles to a position not less than 2.5 miles 227° from Thunder Cape.

From Mission River entrance, vessels shall take departure from the Entrance Breakwater Light, and shall lay a course of 110° for 2.5 miles; thence 117½° for 8.75 miles to a position not less than 2.5 miles 227° from Thunder Cape.

Vessels shall now lay a course 098° for 26 miles, passing not less than 2 miles 187° off Thunder Cape and passing not less than 1.75 miles 187° from Trowbridge Island Light in order to pass not more than 2.5 miles off Blake Point Light abeam; thence 121° for 2 miles to a point not less than 1 mile 211° from Passage Island Light; thence 148° for 15 miles; thence 118 ¾° for 175.5 miles to a point not less than 2.5 miles 030° from Whitefish Point; thence joining the downbound course to Ile Parisienne.

Upbound vessels for S shore and W Lake Superior points shall lay a course from Point Iroquois Shoal Lighted Bell Buoy 45, E of Point Iroquois, 300° for 5 miles; thence 319° to a point 4 miles off Ile Parisienne Light; thence 328° to a point 1 mile off Whitefish Point Light; thence lay a course not over 280° to a point not more than 4.5 miles off Crisp Point Light; thence to pass not more than 4 miles off Manitou Light and not more than 5 miles N of Copper Harbor Light, Eagle Harbor Light, and Devils Island Light and thence to destination.

Upbound vessels for Two Harbors shall follow the general upbound course to a point 5 miles N of Devils Island, thence steer 258° to destination.

Upbound vessels for Taconite Harbor shall follow the general upbound course on Lake Superior to a point 5 miles N of Copper Harbor, then steer 270° to destination.

Upbound vessels for Silver Bay shall follow the general upbound course on Lake Superior to a point 8 miles N of Outer Island, then steer 279° for destination.

Upbound vessels for Ashland when 5 miles N of Eagle Harbor Light shall lay a course to pass 6.5 miles off Michigan Island Light and thence to South Channel.

Upbound vessels for Marquette shall lay a course from a point not over 4.5 miles off Crisp Point Light to pass not more than 4.5 miles off Au Sable Light, thence to destination.

Upbound vessels for Thunder Bay shall take departure from a point 0.6 mile 293° from Gros Cap Reefs Light; thence steer 000° for 1.5 miles; thence head on Whitefish Point Light, 318 ¾° for 8.6 miles to a point 1.5 miles 230° from Ile Parisienne Light; then 339 ¾° for 13 miles to a point 6 miles 065° from Whitefish Point Light; thence 300° for 192 miles to a point not more than 0.5 mile 211° from Passage Island Light; thence 310° for 3 miles; thence 277° for 26 miles, passing not more than 0.75 mile 187° from Trowbridge Island Light, not more than 1 mile 187° off Thunder Cape and not more than 0.5 mile 170° off Hare Island Reef Lighted Buoy A2; thence 319¼° for 8 miles to pass not less than 1 mile 048° from Welcome Island Light; thence to destination.

Vessels bound for Mission River entrance, from the position not more than 0.75 mile 187° off Hare Island Buoy A2, shall lay a course 292¼° for 8 miles; thence 290° to destination.

Vessels upbound to other points on the N shore of Lake Superior shall follow the courses as laid down from the Gros Cap Reef Light, to the position 6 miles 065° from Whitefish Point Light; thence to destination.

It is understood that masters may exercise discretion in departing from these courses when ice and weather conditions are such as to warrant it. The recommended courses are shown on charts 14960 and 14961, Lake Superior.

Limits of anchorage in Whitefish Bay are recommended as follows: From a point on the Birch Point range 0.5 mile above Gros Cap, 340° for 2.5 miles; thence 314° to a point 2 miles off Ile Parisienne Light. From a point on the Birch Point range 0.5 mile above Gros Cap, 229° for 0.5 mile; thence 300° for 2.7 miles; thence to a point 3.5 miles off Ile Parisienne Light. No downbound vessel to proceed from this anchorage area unless authorized to do so by the U.S. Coast Guard.

Pilotage.–The waters of Lake Superior are Great Lakes undesignated waters; registered vessels of the United States and foreign vessels are required to have in their service a United States or Canadian registered pilot or other officer qualified for Great Lakes undesignated waters. Registered pilots for Lake Superior are supplied by Upper Great Lakes Pilots, Inc. (See appendix for address.) A pilot exchange point is at the head of St. Marys River about 3.5 miles SE of Point Iroquois. The pilot boat, J. P. IX, docks just above the locks at Sault Ste. Marie. (See Pilotage, chapter 3, and **46 CFR 401**, chapter 2.)

Principal ports.–Compared with the other Great Lakes, Lake Superior is fairly well provided with natural harbors that provide refuge for vessels. In addition, several harbors have been improved with breakwaters to provide the necessary protection. The most important harbors in the lake are at Duluth-Superior and at Lakehead Harbor in Thunder Bay. Drydocking facilities for deep-draft vessels are at Superior and Lakehead Harbor.

Charts 14962, 14884.–**Whitefish Bay** is a large deep bay in the SE corner of Lake Superior in the approach to the head of St. Marys River. **Point Iroquois** (46°29.0'N., 84°38.0'W.), marked by an abandoned lighthouse, is on the SE side of the bay on the W side of the entrance to St. Marys River. **Nadoway Point** is 2.2 miles W of Point Iroquois. **Mission Hill** is a prominent 400-foot hill between the points. A rocky ledge, marked on the NE side by a buoy, extends about 2 miles N from Nadoway Point.

From Nadoway Point, the S shore of Whitefish Bay extends 7.5 miles SW to the mouth of **Pendills Creek,** thence NW for 2.7 miles to **Salt Point. Pendills Bay** is the bight formed between the points. Shoals extend about 0.4 mile offshore in the E part of the bay and increase to 1 mile offshore NW of Pendills Creek.

Chart 14962.–From Salt Point W for 3.8 miles to Naomikong Point, shoals extend 2 miles from shore, and thence the shoal limit extends NW across the mouth of Tahquamenon Bay. **Naomikong Point,** and **Menekaunee Point** close W, form the S entrance point of **Tahquamenon Bay,** the SW part of Whitefish Bay. A rocky ledge with depths less than 6 feet extends 1 mile N from Naomikong Point, and a 4-foot spot is 0.5 mile E of the point. **Tahquamenon Island** is a small island 3 miles N of Menekaunee Point in the mouth of the bay. Isolated shoals with depths of 6 feet or less are 0.7 mile SE of the island.

Tahquamenon River flows into the W side of Whitefish Bay just N of the N entrance point to Tahquamenon Bay. A shoal with depths of 2 feet extends from the mouth of the river S for about 3.5 miles into Tahquamenon Bay. A private light about 1.3 miles E of the mouth marks the river approach. The entrance to the river is shoal and should be approached with care. In 1981, the channel across the bar had a controlling depth of 2 feet. The river is navigable by small boats for about 16 miles. In 1963, the least depth in this stretch was 3 feet. A launching ramp is on the S side of the river mouth. Fuel is available nearby.

From the Tahquamenon River N for 15.5 miles to Whitefish Point, the shoal border decreases in width from 2.7 miles to about 0.2 mile. Ruins of two abandoned docks extend offshore at the mouth of **Shelldrake River,** 8.5 miles N of Tahquamenon River.

Whitefish Point Harbor, entirely artificial, is on the NW side of Whitefish Bay about 1 mile SW of the tip of Whitefish Point. The harbor, protected by breakwaters on the N, S, and E sides, serves as a harbor of refuge for shallow-draft vessels.

Channels.–The harbor is entered from Lake Superior through a dredged channel leading N, then W, between the breakwaters to the S end of the basin. The outer ends of the breakwaters are marked by lights. In 1981, the controlling depths were 8 feet in the entrance, except for shoaling to 6 feet along the W edge, and 10 feet in the basin. In July 1982, it was reported that the entrance had shoaled to 7 feet.

Small-craft facilities.–Transient berths for craft to 60 feet, gasoline, water, and a launching ramp are available at a facility developed by the Michigan State Waterways Commission at the N end of the basin. Gasoline and water are available at a fishery dock on the W side of the basin.

Whitefish Point, on the W side of the entrance to Whitefish Bay, has sandhills and some trees. In 1978, it was reported that the point was a poor radar target. **Whitefish Point Light** (46°46.3'N., 84°57.4'W.), 80 feet above the water, is shown from a white cylindrical tower on the point; a fog signal, radiobeacon, and a radar beacon (Racon) are at the light. (See Racons, chapter 1, for additional information.)

From Whitefish Point WSW for 20 miles to Little Lake Harbor, the shore is sandy, wooded inshore, and generally bold. Shoals extend about 0.5 mile from shore. None of the rivers which empty into the lake in this stretch are navigable.

Crisp Point Light (46°45.2'N., 85°15.3'W.), 58 feet above the water, is shown from a white conical tower 14 miles W of Whitefish Point. The buildings at the abandoned Coast Guard station at Vermilion, 4.5 miles E of Crisp Point Light, are a good landmark. Wrecks 1 mile N of Crisp Point Light and 0.5 mile offshore 2.4 miles E of the light have unknown depths over them.

Little Lake Harbor, 20 miles W of Whitefish Point, is the only harbor of refuge in the 49-mile stretch between that point and Grand Marais. **Little Lake,** oval in shape, about 0.5 mile long and 0.3 mile wide, is separated from Lake Superior for most of its length by a low sand ridge and by higher bluffs along the remainder. The lake has depths of 18 feet and more with good water close to shore.

Channels.–A dredged channel leads from Lake Superior through a stilling basin between converging breakwaters and thence through the sand ridge into Little Lake. The outer ends of the breakwaters are marked by lights. In 1981-September 1982, the controlling depths were 8 feet in the channel to the stilling basin with 7½ feet in the basin, thence in August-September 1982, 7 feet to the lake. The channel is subject to extensive shoaling.

Boat operators using the harbor are cautioned to use care in navigating the entrance area, and are advised that storm action may cause additional shoaling.

Small-craft facilities.–A T-shaped dock developed by the Michigan State Waterways Commission is on the NE side of Little Lake. In July 1981, depths at the face of the dock were 6 to 7 feet. Transient berths, gasoline, water, electricity, sewage pump-out facilities, and a launching ramp are available. Other services are very limited because of the isolated location of the harbor.

From Little Lake Harbor W for 29 miles to Grand Marais, the shoreline is bold. Shoals extend about 0.5 mile from shore.

Charts 14962, 14963.–Grand Marais, Mich., is a village and small-craft harbor in **West Bay,** 29 miles W of Little Lake Harbor. It is an important harbor of refuge, being the only harbor of any kind along the dangerous 65-mile stretch of shore between Little Lake and Grand Island. West Bay has depths over 18 feet for a length of 1.3 miles and a width of 0.3 mile. The bay is separated from Lake Superior at the W end by a low sand ridge and at the E end by a shallow sandspit. The natural entrance to the bay, across the spit, has been closed by a pile dike. The dike is reinforced with riprap, but in 1981, it was in ruins and was not visible above the water. Numerous submerged piles at the dike are a hazard to any craft.

Prominent features.–Prominent are a red brick school and chimney in the village and a white building on the W side of the harbor entrance.

Grand Marais Harbor of Refuge Outer Light (46°41.3'N., 85°58.5'W.), 40 feet above the water, is shown from a white square pyramidal skeleton tower, upper part enclosed, on the outer end of the W pier; a fog signal is at the light.

Channels.–A dredged entrance channel between parallel piers leads across the sandspit which separates Lake Superior and West Bay. The outer and inner ends of the W pier and the outer end of the E pier are marked by lights. In 1981, the controlling depth in the channel was 15 feet except for shoaling along the edges.

Anchorage.–West Bay has good anchorage in depths of 18 to 40 feet, sand bottom. Sand moving in through breaks in the dike has caused shoaling in the E end of the harbor, so anchorage in the W end is advised.

Grand Marais Coast Guard Station, operated on weekends during the boating season, is on the W side of the entrance channel.

Small-craft facilities.–A public dock developed by the Michigan State Waterways Commission at the W end of the harbor provides gasoline, diesel fuel, water, electricity, sewage pump-out, and a launching ramp. Arrangements can be made for minor repairs.

From Grand Marais, the shore extends WSW for 7 miles, thence NW for 1.7 miles to Au Sable Point. **Grand Sable,** a steep bluff with elevations of 400 feet above the lake, extends from 1 mile W of Grand Marais to within 1 mile of Au Sable Point. Shoals extend 0.2 to 0.4 mile offshore in this stretch.

Au Sable Light (46°40.3'N., 86°08.4'W.), 100 feet above the water, is shown from a white conical tower, red dwelling attached, on **Au Sable Point.**

Local magnetic disturbance.–A large area of magnetic disturbance has been observed about 40 miles NW of Au Sable Point.

Chart 14963.–A shoal with a least depth of 6 feet extends 0.9 mile NW from Au Sable Point.

Pictured Rocks National Lakeshore occupies the entire shore from 1.5 miles W of Grand Marais W to Au Sable Point, thence SW for 28 miles to within 2.5 miles of Munising.

From Au Sable Point, the shore extends SW for 17.5 miles to **Grand Portal Point.** The shore for most of this reach is bluff with high points up to 100 feet above the lake close to shore. About 4 miles NE of Grand Portal Point, the shore changes to sheer exposed cliffs over 100 feet high. Except for 23- and 24-foot shoals about 0.5 mile offshore 3 and 4 miles

NE of Grand Portal Point, respectively, no outlying obstructions are along this stretch.

Charts 14963, 14969.–From Grand Portal Point, the shore trends SW for 9.7 miles to **Sand Point.** The cliffs of Pictured Rocks extend along the first 8 miles of this stretch. **Sail Rock and Miners Castle Point,** 1 and 6 miles SW of Grand Portal Point, respectively, are prominent. S of Pictured Rocks, a high wooded bluff continues close to shore past Sand Point. Shoals extend about 0.3 mile offshore in this stretch. About 2.2 miles SW of Miners Castle Point, a shoal with a least depth of ½ foot makes out from shore and extends SW to a point 0.3 mile NW of Sand Point. The shoal is marked by a lighted bell buoy.

Grand Island, about 7.5 miles long and 3.5 miles wide, is a high wooded island W of this reach. The N end is 9 miles W of Grand Portal Point, and the SE end is 0.7 mile W of Sand Point. **Grand Island Light** (46°33.7'N., 86°40.9'W.), 190 feet above the water, is shown from a white column with a white square daymark on the NW point of the island. Shoals extend about 0.5 mile off the two points at the N end of the island, and a shoal with depths of 2 to 6 feet extends 0.5 mile S and SW from the S point of the island. A buoy marks the SW edge and the S edge of the shoal at the S end of the island. Shoals extend no more than 0.3 mile off the E and W shores of the main body of the island.

The **Thumb,** the SE part of Grand Island, is high and roughly oval in shape, about 3 miles long and 1 mile wide. The Thumb is connected to the SE side of Grand Island by a low narrow neck of land, with bays formed on either side between the Thumb and the island. **Trout Bay** is N of the neck, and **Murray Bay** is S. An abandoned lighthouse is on the SE side of the Thumb.

A shoal with depths of 10 to 18 feet extends 0.6 mile N from **Trout Point,** the N point of the Thumb. A shoal, with a depth of 8 feet at the outer edge and marked by a lighted bell buoy, extends 0.5 mile E from shore just SE of Trout Point. The shoal border for the remainder of the E side of the Thumb is narrow and is marked by a buoy opposite Sand Point.

A narrow deepwater channel leads between the SE side of the Thumb and the shoal off Sand Point to Grand Island Harbor. The shoal is marked on its W edge by a lighted bell buoy; least depth of the shoal is ½ foot. The channel is marked by a 217° lighted range at Munising.

Grand Island Harbor, the area of deep water off the S end of Grand Island, is a refuge during N storms for the largest vessels plying the Great Lakes. Anchorage with good holding ground is in the mouth of Murray Bay, between the S point of Grand Island and **Wick Point,** the S point of the Thumb. Avoid the submerged cables that extend from Powell Point to the S end of Grand Island.

South Bay, between Sand Point on the E and **Powell Point** on the W, extends 2.5 miles S from Grand Island Harbor. Shoals extend about 0.2 mile from the shores of the bay.

Munising Harbor is at the S end of South Bay at the town of **Munising, Mich.** Prominent are the lighted radio masts on the high ground W of the town and the black stack and silver tank at the Kimberly-Clark Corp. on the SE side of the town. A hospital is in the town. A 217° lighted range in the town marks the harbor approach. **Anna River,** which flows into the SE corner of South Bay, is not navigable by even small craft.

Munising Coast Guard Station, operated on weekends during the boating season, is in the town of Munising at the front range light.

Towage.–Tugs are available from Sault Ste. Marie and Duluth. (See Towage under those ports.)

Wharf.–The Munising Paper Division of Kimberly-Clark Corp. receives coal at a 700-foot wharf 2,000 feet W of the mouth of Anna River. The wharf has reported depths of 14 to 23 feet alongside and a deck height of about 5 feet.

Small-craft facilities.–The L-shaped city dock is 0.6 mile W of the mouth of Anna River. The dock has depths of 14 to 21 feet along the outer face and depths greater than 6 feet along the remainder of the outer half. Limited transient berths, electricity, and sewage pump-out facilities are available. Fuel is available by tank truck and some repairs are available from local garages. A launching ramp is 0.6 mile NW of the dock. The ruins of a large dock are 0.4 mile NW of the city dock.

From Powell Point, on the W side of the entrance to South Bay, the shore trends SW for 1.5 miles, thence NW for 3 miles to **Fivemile Point,** and thence W for 2.5 miles to **Au Train Point. Bay Furnace** is the bight formed W of Powell Point. From a width of 0.2 mile in Bay Furnace, the shoal border increases to a width of 1.2 miles NE of Fivemile Point. **Williams Island** is near the outer edge of the shoals NE of Fivemile Point. **Wood Island,** surrounded by shoals, is 2 miles N of Fivemile Point. A deep passage, obstructed by several detached 20- to 24-foot spots, leads between Wood and Williams Islands. Shoals extend 0.9 mile N of Au Train Point, and a detached shoal with a least depth of 10 feet is 1.3 miles N of the point.

The W approach to Grand Island Harbor, S through the deep water between Williams Island and Grand Island, is marked by a directional light on the S shore of Bay Furnace. A midchannel lighted bell buoy in Bay Furnace marks the turn to E between Powell Point and the S end of Grand Island.

Charts 14963, 14970.–**Au Train Bay** is the bight between Au Train Point and **Au Train Island,** 5 miles W. Au Train Island is 1.1 miles N of the mainland point that forms the W side of the bay. A shoal, with a depth of 10 feet near the outer end, extends 1.3 miles NE from the point. Around the remainder of Au Train Bay, deep water is within 0.5 mile of shore. Shoals with depths of 18 and 11 feet near the outer edges extend 1.2 miles N and 0.6 mile W from Au Train Island, respectively.

Shelter Bay is the bight between Au Train Island and the mainland shore 2.1 miles W. A 17-foot shoal is in the middle of the bay, 0.9 mile W of Au Train Island. The W shore of the bay is bluff and has deep water within 0.2 to 0.6 mile.

From Shelter Bay, the shore becomes low and rocky for 2 miles NW to **Laughing Fish Point**(46°32.0'N., 87°01.2'W.), 11.7 miles NW of Au Train Point. From Laughing Fish Point, the shoreline continues low and rocky and trends SW for 5 miles to the mouth of **Sand River**, thence W for 12 miles to the mouth of **Chocolay River**, and thence become bluff again for 3 miles NW to **Lighthouse Point**. **Shot Point**, 3 miles W of Sand River, juts 1 mile N into the lake. Shoals extend 1 mile N in the vicinity of Laughing Fish Point and at Shot Point. Otherwise, deep water is within 0.7 mile of shore in this stretch. A group of rocks awash, marked by a buoy, is near the outer edge of the shoal border 0.8 mile NW of the mouth of Chocolay River. **Marquette Bay** is the bight formed between the mouth of Chocolay River and Lighthouse Point.

Caution.–A 20-square-mile Emergency External Stores Jettison Area for K. I. Sawyer Air Force Base is about 9 miles NE of Marquette. Aircraft in distress may jettison auxiliary fuel tanks and any other externally mounted stores capable of being jettisoned. All vessels are cautioned not to loiter in this charted area and to avoid it completely if possible, since its use will be under emergency conditions and advance warning to clear the area will not be possible.

Marquette Harbor, also known as **Marquette Lower Harbor**, is on the NW side of Marquette Bay, about 35 miles W of Grand Island Harbor, the nearest safe harbor to the E. The town of **Marquette, Mich.**, fronts on the harbor and is a base for commercial fishermen. Coal and caustic soda are received in the harbor.

Prominent features.–Prominent are a silver tank about 2 miles S of the harbor, a black standpipe 500 feet above the lake on Mount Mesnard 2 miles SSW of the harbor, a stack on the SW side of the harbor, and the lighted radio masts 3 miles W of the harbor.

Marquette Light (46°32.8'N., 87°22.6'W.), 77 feet above the water, is shown from a red square tower on a dwelling on Lighthouse Point.

Channels.–A breakwater extends S and SE from Lighthouse Point to enclose a dredged harbor basin on its W side. The breakwater is marked by lights at the bend and at the outer end; a fog signal is at the outer end. Buoys mark the W limit of the dredged basin. In 1980, the controlling depth in the basin was 24 feet lesser depths along the edges.

Anchorage.–The harbor basin affords good anchorage. It is reported that vessels also sometimes anchor SW of the outer end of the breakwater.

A special anchorage is at the N end of the harbor. (See **33 CFR 110.1 and 110.80b**, chapter 2, for limits and regulations.)

Marquette is a **customs station.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Marquette Coast Guard Station is on the NE side of the harbor basin at the inner end of the breakwater.

Towage.–Tugs are available from Sault Ste. Marie and Duluth. (See Towage under those ports.)

Wharves.–Shiras Generating Plant receives coal at a wharf 1.2 miles SW of Marquette Light. The wharf has 675 feet of berthing space with dolphins, a reported depth of 23 feet alongside, a deck height of 10 feet, and open storage for 250,000 tons of coal. Contract Oil Co. receives caustic soda at a wharf 0.9 mile SW of Marquette Light. The wharf has 500 feet of berthing space with dolphins, a reported depth of 17 feet alongside, a deck height of 9 feet, and tank storage for 9 million gallons. The other wharves on the W side of the harbor are either in disrepair or are seldom used.

Small-craft facilities.–Mooring to the breakwater is prohibited. Limited emergency mooring is available at the inner end of the northernmost dock ruins in the NW corner of the harbor. Gasoline, water, electricity, and ice are available. Repairs are available at a 50-ton marine railway at the N end of the basin.

From Lighthouse Point, the shore is low and rocky for 2 miles N to Presque Isle Harbor. A shoal bank, with bare rocks near the outer end, extends 0.25 mile E from Lighthouse Point. A rock awash is 150 feet E of the point. The NE edge of the shoal bank is marked by a buoy. **Picnic Rocks**, a group of small rock islands, is 0.7 mile N of Marquette Light. A stack 0.3 mile SW and a chimney 0.9 mile NW of Picnic Rocks are prominent.

Presque Isle Harbor, also known as **Marquette Upper Harbor** or as **North Harbor**, is an indentation in the shore N of Marquette Harbor protected on the N side by Presque Isle Point. The two northernmost stacks of the powerplant on the W shore of the harbor are prominent.

Presque Isle Harbor Breakwater Light (46°34.4'N., 87°22.4'W.), 56 feet above the water, is shown from a white cylindrical tower on a white octagonal building on the outer end of the breakwater that encloses the harbor; a fog signal and a radiobeacon are at the light.

Channels.–A breakwater extends SE from the S end of Presque Isle Park to protect a dredged harbor basin on its W side. A buoy marks the E side of the dredged basin, and a lighted buoy marks the outer end of a 3-foot shoal that extends from shore on the SW side of the basin. In 1980, the controlling depth was 30 feet in the approach to the basin from Lake Superior, thence in June 1982, 23 to 28 feet were available in the basin except for shoaling to 17 feet along the W edge.

Wharves.–Two docks at the N end of the harbor basin are owned by the Lake Superior and Ishpeming Railroad Co. Oil is received by Murphy Oil Co. at the merchandise dock. The approach to the wharf has a controlling depth of about 20 feet and is marked on the E side by a private buoy. The slip on the S side of the dock has a reported depth of 21 feet along the outer 400 feet. Iron ore and pellets are shipped from the NE side of the ore dock, 500 feet SW of the merchandise dock. The dock has a 1,200-foot face with a reported depth of 27 feet alongside and a deck height of 7 feet. Storage for 50,000 tons of pellets is available, and loading chutes can load vessels at 3,100 tons per hour.

Presque Isle Station of Upper Peninsula Generating Co. receives coal on the SW side of the ore dock. The SW side of the dock has a 1,300-foot face with a reported depth of 27 feet alongside. An overhead conveyor with a 52-foot diameter hopper extends from shore 200 feet S of the dock. Coal received at the hopper is transported to a 900,000-ton storage area.

Small-craft facilities.–A small-craft basin developed by the Michigan State Waterways Commission is NE of the merchandise dock. In 1978, the basin had reported depths of 5 to 6 feet. Transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out facilities, launching ramps, and harbormaster services are available.

Presque Isle Point (46°35.6′N., 87°22.8′W.) is the N point of the peninsula occupied by Presque Isle Park, which encloses the N side of Presque Isle Harbor. The E side of the point is deep-to, but the shoal border increases in width S to the outer end of Presque Isle Harbor breakwater. **Presque Isle Point Rocks,** a group of small rock islets, are 0.7 mile E of Presque Isle Point. A pinnacle rock covered 10 feet is 0.2 mile E of the rocks. Vessels rounding Presque Isle Point bound to or from Marquette Harbor should keep well outside these rocks. A red sector on the light on the outer end of Marquette Harbor breakwater marks these dangers.

From Presque Isle Point NW for about 22 miles to Big Bay Point, the shore is generally bold. **Little Presque Isle (Granite Point)** (46°38.3′N., 87°27.5′W.) is about 5 5 miles NW of Presque Isle Point. The SE half of the bight between these points is somewhat foul with shoals and small islands. **Partridge Island,** largest in the group, is over 200 feet high. **Middle Bay** and **Partridge Bay** are SE and W of the island, respectively. Caution is advised in navigating these bays. The most dangerous spot, covered 2 feet, is in the center of Partridge Bay 0.5 mile W of Partridge Island. **Larus Island,** 0.8 mile NW of Partridge Island, is the northwesternmost of the group. From Larus Island NW to Granite Point, the shores of the bight are fairly deep-to.

Chart 14963.–From Little Presque Isle NW for about 17 miles to Big Bay Point, Granite Island and Stannard Rocks are the only outlying obstructions. Prominent in this reach are Thoneys (Thoney) Point 4.6 miles NW of Little Presque Isle, Saux Head Point (Sauk Head), 2.7 miles NW of Thoneys Point, **Yellow Dog Point** 3 miles SE of Big Bay Point, and **Granite Point** (46°46.9′N., 87°35.3′W.) 3 miles SE of Yellow Dog Point. Deep water is generally within 0.5 mile of shore except at a point 1.8 miles N of Saux Head Point and at Yellow Dog Point where shoals extend 0.7 mile off.

Granite Island is a small steep island surrounded by deep water 5.6 miles ENE of Thoneys Point. A light on the island is a guide to vessels approaching Marquette Harbor from the N or W.

Stannard Rock, 32 miles NE of Big Bay Point, consists of two large detached rock ledges. The S ledge is covered about 3 feet and the N ledge about 2 feet. In 1956, a few scattered rocks awash were reported between the ledges. **Stannard Rock Light** (47°11.0′N., 87°13.5′W.), 102 feet above the water, is shown from a gray conical tower on a cylindrical crib on the S side of the N ledge. A 14-foot shoal is 1,000 feet SW of the light, and an 18-foot shoal, plainly visible to vessels passing over it in calm weather, is 0.6 mile W of the light.

Local magnetic disturbance.–Magnetic disturbances have been observed around Stannard Rock.

Charts 14963, 14964.–Big Bay Point (46°50.6′N., 87°41.0′W.), marked by a light, is 22 miles NW of Presque Isle Point. A shoal with a depth of 9 feet at the outer end extends 1.1 miles N from the point. A buoy marks the N end of the shoal. **Big Bay** is a deep bight enclosed by Big Bay Point on the E and **Salmon Trout Point** on the W. The S and W shores have deep water within 0.3 mile.

Big Bay Harbor is a small-craft harbor of refuge in the SW corner of Big Bay.

Channels.–A dredged entrance channel leads from deep water in Big Bay between converging breakwaters to an inner harbor basin. The outer ends of the E and W breakwaters are marked by a daybeacon and a light, respectively. In 1979, the centerline controlling depth was 6 feet in the entrance channel with 8 feet in the basin.

Small-craft facilities.–A public docking facility developed by the Michigan State Waterways Commission is in the SW corner of the basin. Transient berths, gasoline, water, electricity, sewage pump-out facilities, and a launching ramp are available.

About 750 feet NW of Big Bay Harbor W breakwater, submerged dock ruins, covered 3 to 9 feet, extend about 500 feet from shore.

Chart 14964.–From Salmon Trout Point, the shore trends NW for 8 miles to Huron River Point, thence 9 miles W to the S side of the mouth of Huron Bay. **Conway Point** and **Pine River Point,** 2 and 4 miles NW of Salmon Trout Point, respectively, are prominent. The **Huron Mountains** rise close behind the shoreline. At **Huron River Point** (46°54.6′N., 87°54.0′W.), a shoal with depths of 8 to 10 feet at the outer end extends 1.5 miles NE. The shore in the remainder of this stretch is generally clear within 0.5 mile.

Huron Islands are a group of small islands centered 5 miles NW of Huron River Point near the entrance to Huron Bay. The islands are all bold and deep-to except for the easternmost of the group, from which rocks awash extend 0.3 mile SE. **Huron Island Light** (46°57.8′N., 87°59.9′W.), 197 feet above the water, is shown from a gray granite tower on a dwelling on the northwesternmost of the island group.

Huron Bay, extending about 12 miles SW into the shoreline, is about 3 miles wide at the mouth and narrows to about 0.5 mile at the head. The bay has deep water within 0.5 mile of shore in the outer part, and the shores become deep-to in the inner part. **Point Abbaye** is the point at the outer end of the peninsula that separates the W side of Huron Bay from Keweenaw Bay. **Point Abbaye Reef,** with a depth of 6 feet at the outer end, extends 1.5 miles E from the point. Buoys mark the N and SE edges of the reef.

Huron Bay Light marks the outer end of a small projection of land on the SE side of the bay about 6 miles SW of Point Abbaye.

Skanee, Mich., is a small village with dilapidated wharves about 0.8 mile S of Huron Bay Light. A small-craft basin is between the light and village. In 1978, the reported controlling depths were 5½ feet in the entrance channel with 7 to 10 feet in the basin. Transient berths, gasoline, water, electricity, sewage pump-out facilities, and a launching ramp are available.

Huron Bay, Mich., is an abandoned village on the E side near the head of Huron Bay. The ruins of two wharves extend about 1,000 feet from shore. The slip between the wharves has depths less than 2 feet except at the outer end. Very shoal water is on the outer sides of both wharves.

Charts 14964, 14971.–Keweenaw Bay extends about 22 miles SW on the NW side of Point Abbaye and is enclosed on the W by the inner end of the E side of Keweenaw Peninsula. The bay is 12 miles wide at the entrance and has a minimum width of 1.1 miles abreast Sand Point, about 2.3 miles from the head of the bay. The E shore of the bay has deep water within 0.4 mile and the W shore within 0.7 mile.

A headland, 1 mile wide at the inner end and 2 miles wide at the outer end, extends 1.7 miles NW from shore about 13 miles SW of Point Abbaye. **Sand Bay** is the bight on the NE side of the headland, and **Pequaming Bay** is the bight on the SW side. **Sand Point,** marked by a light, is a projection from the W side of the bay about 2.3 miles from the head. A 1-foot shoal, marked on the SE side by a buoy, extends 1,000 feet S from Sand Point. **L'Anse Bay** is the part of Keweenaw Bay above Sand Point. **Portage River** (see also chart 14972) flows into the W side of Keweenaw Bay about 13.5 miles W of Point Abbaye.

Pequaming, Mich., is a village on the NW side of Pequaming Bay, about 15 miles SW of Point Abbaye. Dock ruins extend about 1,200 feet S from the headland that forms the W side of the bay. A wharf in poor condition parallels the dock ruins with a slip between. In 1966, depths in the slip were 17 feet at the outer end decreasing to 7 feet at the inner end, and depths were 19 feet along the outer 500 feet of the E side of the wharf. The mooring facilities on the E side of the wharf are dilapidated. NE of the wharf, submerged dock ruins extend S from the N shore of the bay. A small island at the outer end of the ruins is the only part visible. A line of submerged cribs, in depths of 8 to 14 feet, extends E from the island to the E shore of the bay. No facilities are maintained at the village. There is excellent protection, but caution must be exercised when approaching or landing at the dock ruins.

L'Anse, Mich., is a village at the mouth of **Falls River** on the SE side of L'Anse Bay. A silver water tank on the S side of the river mouth and a stack on the N side of the river mouth are prominent.

Caution.–Submerged ruins and a sunken wreck extend 500 feet NW from the N side of the river mouth. A buoy marks the outer end of the ruins.

Wharf.–The wharf of the Celotex Corp. extends 800 feet NW from the S side of the river mouth, thence 3,000 feet SW along the shore. The N face has depths of 19 feet, decreasing to 12 feet 300 feet from the outer end. The W face has depths of 19 to 22 feet along the NE 900 feet. Vessels should approach the wharf on a line parallel with the NE face to avoid a 17-foot shoal about 650 feet WNW of the N corner of the wharf.

Small-craft facilities.–The municipal marina is on the N side of the river mouth. In 1972, the controlling depth was 4 feet in the approach and marina basin. Water is available at the marina and gasoline and most supplies are available nearby in town. L'Anse has a hospital.

Baraga, Mich., is a village on the NW side of L'Anse Bay. The silver tank on high ground W of the village is prominent. Two jetties extend E from shore at the village. The S jetty, 1,200 feet long, has submerged ruins extending 200 feet from its outer end and 900 feet off the S side. About 200 feet N, the second jetty, wooded over, extends 700 feet from shore to depths of about 18 feet. Lime is occasionally received at the village.

Small-craft facilities.–In 1972, the slip between the jetties had depths of 17 to 7 feet. A marina developed by the Michigan State Waterways Commission is on the N face of the S jetty; a launching ramp is on the S face. Gasoline is available. Other services are available in the village.

Keweenaw Bay, Mich., is a village on the W side of Keweenaw Bay opposite Pequaming. An abandoned coal dock in ruins extends E from shore. Rock bluffs just N of the dock are prominent.

Charts 14964, 14972.–Keweenaw Waterway, about 25 miles long, crosses **Keweenaw Peninsula** from Keweenaw Bay on the SE side to the open water of Lake Superior on the NW side. The waterway follows Portage River from its mouth in Keweenaw Bay for 5 miles to Portage Lake, thence extends for 17.5 miles through the lake to its head, and thence follows a dredged cut from the head of Portage Lake to Lake Superior.

Regulations.–An 8 mph (7 knots) **speed limit** is enforced in Keweenaw Waterway. (See **33 CFR**

162.115, chapter 2, for Keweenaw Waterway regulations.)

On the vessel route between Sault Ste. Marie and Duluth, the distance through the waterway is about 5 miles greater than by the open lake route. However, between Marquette and Duluth the waterway provides a savings of about 22 miles, and between Marquette and Ashland a savings of about 26 miles, as compared with the route around the outside of Keweenaw Point. The use of the waterway for refuge is indicated by the fact that more freight passes through the canals in October and November, the stormy season, than at any other time in the year, although the commerce on Lake Superior, as shown by the records at the Sault and at the head of the lake, is heaviest during July and August.

Channels.–The E entrance in Keweenaw Bay is protected by a breakwater that extends S from the E side of the mouth of Portage River. The dredged channel leads W of the breakwater through Portage River, Portage Lake, and thence through the dredged canal connecting Portage Lake with Lake Superior. The entrance at Lake Superior is protected by converging breakwaters. The Federal project depths through the Keweenaw Waterway are 26 to 28 feet through the lower entrance at the mouth of Portage River, thence 25 feet through the river to the deep water in Portage Lake and from the upper end of the lake through the canal, and thence 26 to 32 feet through the upper entrance at Lake Superior. The channels through the waterway are well marked by lighted and unlighted buoys, lights, and lighted ranges.

The breakwater at the mouth of Portage River is riprapped on the channel side, and it should not be approached closer than 20 feet by vessels exceeding a 12-foot draft.

Keweenaw Waterway Lower Entrance Light (46°58.2'N., 88°25.9'W.), 68 feet above the water, is shown from a white octagonal tower on the outer end of the breakwater on the E side of the Keweenaw Bay entrance to the waterway; a fog signal and a radiobeacon are at the light.

Portage River Harbor of Refuge is just inside the lower entrance to the waterway at the mouth of Portage River. This 0.5-mile-long basin has a revetment with bollards on the W side where vessels may moor.

A small settlement with docks of commercial fishermen is on the W side of the river mouth S of the mooring pier. Marinas at the settlement provide limited transient berths, gasoline, water, electricity, and launching ramps. A marine railway and a 20-ton lift are available for repairs. Water and a launching ramp are available N of the mooring pier.

Portage River, the natural outlet of Portage Lake, forms part of the Keweenaw Waterway for 5 miles from its mouth in Keweenaw Bay to Portage Lake.

In 1972, the controlling depth in Portage River was 19 feet. In 1975, the controlling depth in the harbor of refuge was 24 feet except for shoaling to 22 feet in the SE corner and shoaling to 19 feet along the mooring pier on the W side.

Portage Lake, about 17.5 miles long, is generally narrow, resembling a river, but has no sensible current. The lower 3.5 miles of the lake, locally known as Big Portage, is over 2 miles wide. Portage River flows from the SE corner of the lake, and **Pike Bay** is in the SW corner, the two being divided by the flats at the mouth of **Sturgeon River.** About 3 miles N of the head of Portage River, the lake is divided by **Grosse Point. Torch Bay** extends E from the point. The main body of the lake extends 2 miles N, thence turns W at **Pilgrim Point** for about 5.5 miles between the towns of Hancock and Houghton, and thence extends N for about 5 miles to the head of the lake. Above Grosse Point, the lake narrows to 0.5 mile and in the upper part has widths of 0.15 to 0.4 mile.

Channels.–Keweenaw Waterway leads from the head of Portage River through the natural deep water of the lower part of Portage Lake. A 19-foot spot and a 20-foot spot are in the N part of Portgage Lake about 0.7 mile and 1.8 miles S of Pilgrim Point Light in about 47°05'46"N., 88°30'26"W. and 44°04'52"N., 88°30'26"W., respectively. An unmarked shoal extends about 240 yards off the E shore about 1.3 miles NNW of Grosse Point; caution is advised. Above Pilgrim Point, the channel is dredged. In 1977, the controlling depth in the dredged channel was 25 feet.

Pike Bay, at the SW corner of Portage Lake, is entered through a narrow channel with depths of about 9 feet. The pile remains of a former lumber wharf are on the W side of the bay at the village of **Chassell, Mich.**

Torch Bay extends NE and bends N for about 6 miles from Grosse Point. The bay narrows from about 1.3 miles wide at the mouth to 0.15 mile at the head. The lower part of the bay is deep, but the upper part is shallow. **Torch Lake Canal** connects the head of the bay with Torch Lake. A privately dredged narrow channel leads for 4 miles through the upper part of Torch Bay and Torch Lake Canal, but it has not been maintained since 1974. In 1972, the channel had a controlling depth of 19 feet. **Torch Lake** is about 5 miles long with a maximum width of 1.5 miles. The towns of **Lake Linden** and **Hubbell** and a few logging plants are on the NW side of the lake. Coal is received at a wharf at Hubbell. For several years, extensive stamp sand deposits along the W shore of the lake were in the process of being removed for reprocessing and redeposit into the lake, causing a continuing change in the shoreline and depths. These reclamation operations ceased prior to 1970.

Dollar Bay is a small inlet 2 miles N of Grosse Point on the turn of Portage Lake opposite Pilgrim Point. A repair yard on the NW side of the entrance to the bay at the village of **Dollar Bay, Mich.**, makes hull and engine repairs to small craft and fishing vessels.

Heating oil and diesel fuel are received at a wharf operated by Standard Oil Co. 0.6 mile W of the mouth of Dollar Bay. The wharf has 250 feet of berthing space with dolphins, a reported depth of 22 feet alongside, a deck height of 6 feet, and tank storage for 166,000 barrels. Upper Peninsula Power Co. receives coal at a wharf 0.4 mile W. The wharf is 880 feet long with a reported depth of 20 feet alongside and a deck height of 6 feet. There is storage for 80,000 tons of coal.

Hancock, Mich., on the N side of Portage Lake 3.5 miles W of **Dollar Bay**, and **Houghton, Mich.**, on the S side of the lake opposite, are the largest communities on Keweenaw Waterway. Houghton is a **customs station.** Hancock has two large hospitals. The wharves at Hancock are in good condition, but most of those at Houghton are becoming ruins.

A combination highway and railroad double-deck vertical lift bridge crosses Portage Lake from Houghton to Hancock. The bridge has a clearance of 7 feet down and 103 feet up. The lift span may be stopped at intermediate elevations, with a pointer on the lift span indicating the vertical clearance above high water, which for this bridge is 3.3 feet above Low Water Datum. Fixed red lights are shown on top of the lift span towers and a fixed white light is shown at center of top of the lift span. A light at center of the bottom of the lift span shows red and is changed to green when the lift is raised sufficiently for passage. (See **33 CFR 117.1 through 117.59 and 117.635**, chapter 2, for drawbridge regulations.)

Salt is received by Mattila Contracting Co. at a 550-foot wharf 1.8 miles W of the lift bridge at Hancock. The wharf has a deck height of 4 feet and reported depths of 12 feet alongside, increasing rapidly away from the dock.

Small-craft facilities.–A marina developed by the Michigan State Waterways Commission at Hancock, just E of the lift bridge, provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and a launching ramp. Dock space for small craft is also available at the village of **Ripley, Mich.**, just E of Hancock. A public docking facility for day use only is at Houghton, just E of the lift bridge.

Ferry.–A ferry service operates between Houghton, 0.5 mile E of the lift bridge, and Isle Royale in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich., 49931.

The upper entrance to Keweenaw Waterway leads SE from deep water in Lake Superior between converging breakwaters to a revetted dredged canal that leads S to the upper end of Portage Lake. In 1973-1981, the controlling depth through the canal was 22 feet except for shoaling along the edges. Mooring to the revetments is prohibited.

Keweenaw Upper Entrance Light (47°14.1′N., 88°37.8′W.), 82 feet above the water, is shown from a white square tower on the outer end of the E breakwater at the Lake Superior entrance to Keweenaw Waterway; a fog signal is at the light. The radiobeacon is about 0.6 mile SE of the light. The outer end of the W breakwater is marked by a light.

Portage Coast Guard Station is on the E side of the waterway 0.8 mile SE of the breakwater entrance.

Lily Pond Harbor of Refuge is a basin about 1.5 miles SE of the breakwater entrance. Due to unsafe structural conditions, the revetment on the E side of the basin can no longer be used for mooring. Breakwater stone for stabilization extends 15 to 20 feet from the revetment.

Chart 14964.–From the lower entrance to Keweenaw Waterway, the SE shore of Keweenaw Peninsula extends NE for 15 miles to **Traverse Point** (47°08.5′N., 88°14.1′W.). Deep water is within 0.5 mile of shore. **Traverse Island** is 2 miles offshore 4.3 miles SSW of Traverse Point. A narrow shoal extends 0.8 mile SW from the SW point of the island. In 1966, a small gravel island, 3 feet high, was reported near the outer end of the shoal. Shoals extend 0.1 to 0.2 mile off the other shores of the island. A deep passage 1.7 miles wide leads between the island and the mainland shore.

Little Traverse Bay is a semicircular bight about 2 miles wide on the SW side of Traverse Point. The bay provides protection from W to NE winds and has a sandy bottom. **Grand Traverse Bay** is a broad indentation on the N side of Traverse Point. A shoal with a depth of 14 feet at the outer edge extends 1.1 miles from the N shore of the bay. In 1965, the ruins of a coal dock, covered 1½ feet, were reported to extend about 150 feet from shore near the NW corner of the bay. A stack at the village of **Gay, Mich.**, just N of the bay, is prominent.

Grand Traverse Bay Harbor is a small-craft harbor near the center of the W shore of Grand Traverse Bay at the mouth of the **Traverse River**, about 18 miles NE of the lower entrance to Keweenaw Waterway.

Channels.–A dredged entrance channel leads from deep water in Grand Traverse Bay between breakwaters at the mouth of Traverse River to an inner harbor basin. The outer ends of the breakwaters are marked by lights. An extension channel leads NE from the inner basin upstream in the river for about 150 feet. In June 1983, the controlling depths were 11 feet in the approach channel and between the breakwaters, thence 9½ feet in the basin except for shoaling to 8 feet along the N and NW limits of the basin, and thence 8½ feet in the extension channel with shoaling to 3½ feet along the limits of the project and shoaling to 1½ feet at the head of the project.

Small-craft facilities.–Local boaters are the major users of the harbor; facilities for recreational small craft are very limited. No dockside facilities for marine repair or maintenance are available, and the nearest store is about 5 miles by road at the village of Gay. The Michigan State Waterways Commission has developed a public docking facility on the S side of the basin. A launching ramp is available.

From the N side of Grand Traverse Bay, the shore extends NE for about 15 miles to **Point Isabelle** (47°20.7′N., 87°56.2′W.). Shoals extend as much as 0.7 mile from shore in this stretch. Point Isabelle forms the S side of Bete Grise Bay. A shallow rocky bank extends 0.9 mile NE from the point and is marked at the outer edge by a buoy.

Bete Grise Bay extends 2 miles W on the N side of Point Isabelle. The S shore is low and rocky, the W shore low and sandy, and the N shore bluff and rocky. The bay has good holding ground with protection from W to NE winds. **Mount Houghton** and **Mount Bohemia,** N and WNW of the bay, respectively, are prominent. A fire tower is on Mount Bohemia.

Lac La Belle Harbor is at the head of Bete Grise Bay, about 36 miles NE of the lower entrance to Keweenaw Waterway. A dredged canal leads from the head of the bay W for about 0.7 mile to **Lac La Belle,** a small inland lake about 2.5 miles long, 1 mile wide, and up to 37 feet deep. An abandoned lighthouse is on the S side of the canal about 0.2 mile W of the entrance.

Channels.–The canal is entered between parallel piers at its mouth in Bete Grise Bay. The outer ends of the piers are marked by lights. In May 1983, the controlling depth was 12 feet in the approach and in the canal between the piers, thence 10 feet to 300 yards upstream from the end of the piers, thence in June 1984, 6 feet in the remainder of the canal to natural deep water in Lac La Belle.

Anchorage.–Lac La Belle has good anchorage, generally mud bottom.

Small-craft facilities.–The Michigan State Waterways Commission has developed a public dock at the head of the cove at the NW end of the lake. Berths and launching ramps are available.

From the head of Bete Grise Bay, the shore extends E for about 11.5 miles to **Keweenaw Point** (47°24.1'N., 87°43.0'W.), the E extremity of Keweenaw Peninsula. This stretch is generally bold and deep-to. Elevations to 600 feet are close to the water. A boulder ledge, covered 3 feet, extends 0.4 mile S from Keweenaw Point and is marked on the SE side by a lighted buoy. **Keystone Bay,** just W of Keweenaw Point, has good holding ground with protection from W to NE winds.

Manitou Island, 3 miles long and up to 1.4 miles wide, has its W end 2.8 miles E of Keweenaw Point. The deepwater passage between the point and the island is 1.8 miles wide. **Manitou Light** (47°25.2'N., 87°35.2'W.), 81 feet above the water, is shown from a white cylindrical tower on the E point of the island. A fog signal, radiobeacon, and radar transponder beacon (Racon) are at the light. (See Racons, chapter 1, for additional information.)

Rocky ledges extend about 0.3 mile off the N and S shores of Manitou Island, increasing in width toward the narrow W end where the ledge extends 0.8 mile W. **Gull Rock,** marked by a light, is near the outer edge of the ledge W of the island. A 12-foot shoal, marked on the W side by a buoy, is 0.7 mile S of Gull Rock. A boulder, covered 26 feet, is 1.7 miles S of Gull Rock.

Fishermans Bay, an indentation in the E end of Manitou Island, has good holding ground with protection from W to NE winds. A shoal with a depth of 4 feet at the outer end extends 0.4 mile E from the S side of the entrance to the bay.

From the tip of Keweenaw Point, the shore extends N for 2.6 miles, thence turns NW and bends W for 7.5 miles to the entrance to Copper Harbor. The shore in this stretch is low and rocky with high bluffs close behind. Deep water is generally close to shore.

Copper Harbor is a broad inlet on the N side of Keweenaw Peninsula about 9 miles NW of Keweenaw Point. Narrow points of land extend from shore on either side of the entrance and leave an opening 1.4 miles wide. Islands and shoals extend about 1.1 miles E from the W point, and shoals extend about 0.15 mile W from the E point. The entrance between the shoals, marked by a bell buoy and a **190°** lighted range, is about 550 feet wide with a depth of about 14 feet.

Copper Harbor Light (47°28.5'N., 87°51.6'W.), 90 feet above the water, is shown from a white square skeleton tower with a red and white diamond-shaped daymark on the E entrance point.

Copper Harbor provides protection from the NE and NW storms that are frequent in this area. The W end of the harbor has good holding ground. Several shoals in the harbor are dangerous to navigation. A 12-foot shoal is 0.2 mile S of Copper Harbor Light.

Copper Harbor, Mich., is a village on the SW side of Copper Harbor. A public docking facility developed by the Michigan State Waterways Commission at the village provides berths, gasoline, water, electricity, sewage pump-out, and a launching ramp.

Ferry.–A ferry service operates between Copper Harbor and Isle Royale in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich., 49931.

From Copper Harbor W for 8 miles to Agate Harbor, deep water is within 0.2 mile of shore, thence W for 5 miles to Eagle Harbor, dangerous rocks and reefs parallel the shore 0.2 to 0.5 mile off.

Agate Harbor consists of a N and a S harbor parallel to each other and open to W. The harbors are enclosed by two narrow peninsulas that extend W from the mainland and by islets and reefs that extend W from the ends of the peninsulas. These harbors afford safe shelter and good holding ground for small craft. Extreme caution must be exercised to avoid the reefs when entering. The maximum available depth across the outer line of shoals at the entrance to the N harbor is 19 feet.

Little Grand Marais Harbor, about 3 miles W of Agate Harbor, is nearly landlocked, with a narrow opening to N. The entrance is blocked by a shoal.

Eagle Harbor, 13.5 miles W of Copper Harbor, is a partially enclosed bay on the N side of Keweenaw Peninsula. The harbor is about 1 mile long and 0.2 mile wide, but only the center has good depths, 12 to 20 feet. The bottom in this area is stone, and the holding ground is not good.

Eagle Harbor Light (47°27.7'N., 88°09.5'W.), 60 feet above the water, is shown from a white octagonal tower on a red dwelling on the W entrance point to Eagle Harbor; a radiobeacon is at the light.

Channels.–A channel has been dredged between two partially submerged cribs from Lake Superior to the deep water inside the harbor, and a basin has been dredged off a boathouse at the E end of the harbor. The entrance to the harbor is marked by a gong buoy and a 150° lighted range. In June 1984, the controlling depth was 11 feet in the entrance channel and in May 1983, 11 feet in the basin with shoaling to 6 feet along the revetment and the boathouse on the N side of the basin and shoaling to 7 feet along the S and SE limits of the project.

Caution.–Two dangerous reefs are in the approach to Eagle Harbor. A reef with a least depth of 2 feet is 0.25 mile NE of Eagle Harbor Light on the E side of the rangeline. A reef with rocks awash is 0.2 mile NW of the light on the W side of the rangeline.

The slightly deteriorated gray stone cribs on either side of the entrance channel project about 5 feet above the lake level. The W crib is about 100 feet long and the E about 50 feet long, with portions submerged. The horizontal clearance between the cribs is about 120 feet normal to the channel.

Small-craft facilities.–A public docking facility developed by the Michigan State Waterways Commission on the N side of the dredged basin provides gasoline, water, electricity, sewage pump-out, and a launching ramp.

From Eagle Harbor, the shore trends SW for about 28 miles to the upper entrance to Keweenaw Waterway. The shore is generally bluff and may be closely approached with the exception of several shoals. From Eagle Harbor for 7 miles to Eagle River, a succession of dangerous shoals parallel the shore from 0.25 to 1 mile off. **Great Sand Bay** is an indentation from 3 to 6 miles SW of Eagle Harbor. A shoal with a least depth of 6 feet extends 1.1 miles W from the E entrance point to the bay. **Eagle River Shoals,** with a least depth of 4 feet, parallels the shore from the center of Great Sand Bay SW to Eagle River.

Eagle River, Mich., a village 7 miles SW of Eagle Harbor, has been abandoned as a commercial port. The cribs of the former dock are submerged.

Five Mile Point (47°23.5'N., 88°22.3'W.), 4 miles SW of Eagle River, is marked by a prominent abandoned lighthouse. **Hutchinson Shoal,** with a least depth of 14 feet, is 0.5 mile offshore 1.6 miles WSW of Five Mile Point. About 1 mile NE of the entrance to Keweenaw Waterway, a shoal with a depth of 8 feet near the outer end extends 1 mile N from shore. Vessels approaching or leaving the canal should take care to avoid the shoal.

Charts 14964, 14965.–From the Keweenaw Waterway entrance, the shore trends SW for about 41 miles to Ontonagon Harbor. None of the rivers that flow into the lake in this stretch are navigable, nor are there any docking facilities. Prominent are stacks at **Redridge** and **Freda,** 8.5 and 11 miles SW of the waterway, respectively.

Chart 14965.–Misery Bay, 13 miles SW of Freda, and **Sleeping Bay,** just W of Misery Bay, offer limited protection. **Fourteen Mile Point** (46°59.7'N., 89°07.7'W.), on the W side of Sleeping Bay, is marked by a prominent abandoned lighthouse.

Ontonagon Harbor, serving the town of **Ontonagon, Mich.,** is at the mouth of **Ontonagon River.** It is the only harbor of refuge along the 79-mile stretch from the Keweenaw Waterway to Black River Harbor. The harbor is used extensively by commercial fishermen. Coal is received at a wharf on the W side of the river just above the mouth. A hospital is in the town. Prominent are a blue tank, stacks, and buildings at the paper company on the W side of the river mouth and a blue water tank about 1 mile SE of the river mouth.

Channels.–A dredged entrance channel leads from deep water in Lake Superior between the parallel piers to the mouth of Ontonagon River, thence upstream for about 0.4 mile to just below the Ontonagon Street bridge. The approach to the river is marked by a lighted bell buoy, and the outer ends of the piers are marked by lights. In September 1982, the controlling depths were 18 feet in the approach channel, thence 16 feet in the channel between the piers, thence 8½ feet to the bridge. Shoaling in the harbor occurs annually during the winter.

Bridges.–The SR64 bascule highway bridge at the head of the dredged channel has a 30-foot E draw and 31-foot W draw, each with a clearance of 7 feet. (See **33 CFR 117.1 through 117.59 and 117.639,** chapter 2, for drawbridge regulations.) The fixed railroad bridge 0.4 mile upstream has a clearance of 8 feet. Overhead cables 600 feet below and above the railroad bridge have clearances of 20 and 35 feet, respectively.

Small-craft facilities.–A public docking facility developed by the Michigan State Waterways Commission is in a basin on the W side of the river 0.2 mile above the highway bridge. In 1978, it was reported that local interests annually dredge the entrance and basin to a depth of 7 feet. Transient berths, gasoline, water, electricity, sewage pump-out facilities, and a 30-ton hoist are available. Launching ramps are on the W side of the river just above the basin entrance.

From Ontonagon, the shore extends SW for about 6 miles to the village of **Green,** thence W for about 15 miles, and thence SW for 18 miles to Black River Harbor. For 15 miles W from Ontonagon, the shore is low, and shoals extend 0.7 mile off.

Silver City, Mich., is a village at the mouth of **Big Iron River,** 12 miles WSW of Ontonagon. In 1978, the reported controlling depth through the river mouth was 2 feet. The river should not be attempted without local knowledge. Prominent are a 500-foot stack, upper third black, on higher ground 4.5 miles S of Silver City and a television mast 6 miles W of the village. **Union Bay,** just W of Silver City, affords limited protection.

Porcupine Mountains rise about 2 miles W of Silver City and extend 15 miles SW with some elevations 1,200 feet above the lake. The shoal border in the vicinity of the mountains is narrow, thence at the SW end of the mountains, the shoal border widens to 0.5 mile SW to Black River

Harbor. A 20-foot-high rock is close offshore 14 miles NE of Black River Harbor. None of the rivers that flow into this reach are navigable.

Time.–Lakeshore areas of the United States W of 89°50.7′W., which is about midway between Silver City and Black River Harbor on Lake Superior, observe central standard time or central daylight saving time. Areas E of this meridian, including the lakeshore areas of the Canadian Province of Ontario, observe eastern standard time or eastern daylight saving time.

Caution.–A special use airspace, bounded by the following coordinates: 47°45′N., 90°05′W.; 47°45′N., 89°28′W.; 46°55′N., 89°28′W.; 46°55′N., 90°05′W., is used periodically for air-to-air gunnery practice from the surface to an altitude of 45,000 feet. The using agency is the Commander, Second Air Force, Barksdale AFB, La., and the controlling agency is Minneapolis ARTC Center, Federal Aviation Administration.

Black River Harbor, at the mouth of the **Black River,** 37 miles SW of Ontonagon Harbor, offers shelter for commercial fishing and recreational craft. A park and recreation area maintained by the U.S. Forest Service are adjacent to the harbor.

Channels.–A dredged entrance channel leads from deep water in Lake Superior between converging breakwaters to a harbor basin inside the mouth of the river. The outer ends of the breakwaters are marked by lights, and the E side of the channel inside the breakwaters is marked by a buoy. In May 1982, the controlling depths were 8 feet in the entrance channel, thence 7½ feet in the river channel except for shoaling to 5½ feet along the W edge, thence 6 to 8 feet in the basin.

Small-craft facilities.–The surrounding area is sparsely populated, and only a few dock spaces are along the W side of the river. Gasoline, diesel fuel, water, electricity, sewage pump-out facilities, and a launching ramp are available.

From Black River Harbor, the shore is bold for 20 miles SW to Saxon Harbor. Shoals extend about 0.3 mile from shore. **Little Girls Point,** 6 miles NE of Saxon Harbor, is the only projection along this stretch.

Charts 14965, 14966, 14973.–The **State boundary** between Michigan and Wisconsin, about 1 mile NE of Saxon Harbor, follows the course of **Montreal River.** The river is not navigable.

Saxon Harbor, 57 miles SW of Ontonagon Harbor, is at the original mouth of **Oronto Creek.**

Channels.–A dredged entrance channel leads from Lake Superior between converging breakwaters to an inner harbor basin and channel. The outer ends of the breakwaters are marked by lights. In May 1982, the controlling depth was 9 feet in the entrance channel with 6 feet in the inner basin and channel.

Small-craft facilities.–A 300-foot mooring dock with a launching ramp is on the E side of the harbor. Berths, gasoline, electricity, marine supplies, and sewage pump-out facilities are available in the harbor.

Charts 14966, 14973.–From Saxon Harbor, the shore extends NW for about 21 miles to the W end of Long Island at the entrance to Chequamegon Bay. **Marble Point,** about 4 miles NW of Saxon Harbor, is at the W end of the bluffs that characterize the shore W of the Porcupine Mountains. W of Marble Point to Chequamegon Bay, the shore is low and marshy, and shoals extend no more than 0.7 mile from shore.

Long Island is an extension of **Chequamegon Point,** separated from it by a reappearing sandbar. The island and point, both sandy and wooded, have a total length of about 7 miles and a width of less than 0.25 mile. Together they form the NE side of Chequamegon Bay. **Chequamegon Point Light** (46°43.7′N., 90°48.6′W.), 39 feet above the water, is shown from a white square pyramidal skeleton tower, upper part enclosed, on the W end of Long Island; a fog signal is at the light.

The Apostle Islands are N of this stretch of shore. Madeline Island, the S island of the group, is 1.5 miles N of Long Island. **South Channel,** the deepwater passage between Madeline and Long Islands, is the E approach to Chequamegon Bay. The N side of the channel is marked by a lighted buoy that marks the extent of shoals off the SW end of Madeline Island. **La Pointe Light** (46°43.7′N., 90°47.1′W.), 70 feet above the water, is shown from a white cylindrical tower on the N side of Long Island; a fog signal and a radiobeacon are at the light. A wreck, covered 9 feet, is off the NE shore of Long Island, 0.9 mile SE of La Pointe Light.

Charts 14966, 14973, 14974.–Chequamegon Bay, separated from Lake Superior by Chequamegon Point and Long Island, is about 12 miles long and 5 miles wide. The bay is entered through the deep water W of Long Island. The deep water follows close to the W shore of the bay to within about 4 miles of the head, thence extends S across the bay to the wharves at Ashland. The limit of the shoal border off **Houghton Point,** on the W shore 3 miles SW of Chequamegon Point Light, is marked by a lighted buoy. N of Ashland, the E part of the bay is filled with an extensive flat. The shoalest water is around **Oak Point** in the E corner of the bay. The W edge of the flat is marked by a lighted buoy 2.2 miles S of Houghton Point. Above Ashland, the bay shoals gradually toward the head.

Ashland Harbor, serving the city of **Ashland, Wis.,** is on the SE side near the head of Chequamegon Bay. The harbor is sheltered from the storms of Lake Superior by Chequamegon Point, Long Island, and the Apostle Islands. However, the size of the bay permits the generation of waves within itself, and in NE storms, when accompanied by swells coming in from the lake, heavy seas occur in the bay. A breakwater NE of the Ashland wharves provides protection for the harbor facilities. The city of Ashland is on a low bluff that fronts the SE side of the bay. Stacks and spires in the city are prominent.

Channels.–A 1½-mile-long breakwater, on a NW-

SE line about 2 miles NE of the center of the Ashland waterfront, provides protection for the waterfront and the dredged areas along it. The ends of the breakwater are marked by lights. A dredged basin is off the piers in the E part of the harbor, and a dredged channel leads from deep water in the bay along the piers in the W part of the harbor. The basin and channel are well marked by buoys.

In 1972, the controlling depths were 26 feet in the W part of the basin and 24 feet in the E part. In March 1982, the approach to the W channel had a controlling depth of 21 feet with 18 feet in the E part of the channel, and thence in 1972, 20 feet in the W part of the channel.

An old dumping ground is NE of the NE line of the dredged basin, with a depth of 3 feet over it at about 1,200 feet from the basin. The area must be avoided when entering or leaving the harbor by keeping to W of the buoys that mark the E side of the basin. Another discontinued dumping ground is adjacent to the NE side of the breakwater.

Caution.–Much of the Ashland waterfront is in ruins. Piles and submerged piles extend up to 2,300 feet from shore throughout the area. The remains of piles are often adrift in the harbor. Caution is advised.

Ashland is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Towage.–Tugs are available from Duluth. (See Towage under Duluth.)

Wharves.–Ashland at one time had a thriving waterfront, but now only one deep-draft dock is in operation. (For a complete description of the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facility described are reported depths. (For information on the latest depths, contact the operator.)

C. Reiss Coal Co. Dock: (46°35′33″N., 90°53′41″W.); about 1,000 feet of berthing space along W side of pier; 10 to 24 feet alongside; deck height, 4 feet; storage for 225,000 tons of bulk material; receipt of limestone and coal; owned and operated by C. Reiss Coal Co.

Small-craft facilities.–Berths and launching ramps for small craft are available at the city dock, 0.6 mile NE of C. Reiss Coal Co. Dock, and at a boat club 1.8 miles NE of the city dock. Fuel is available by tank truck.

Washburn Harbor is on the W side of Chequamegon Bay, 5 miles N of Ashland on the N side of **Vandeventer Bay.** This harbor was formerly a shipping point for lumber. Ruins of the lumber wharves in the SW part of the harbor are partially submerged and form a hazard to navigation.

Small-craft facilities.–A marina, protected by breakwaters, provides berths with electricity, gasoline, diesel fuel, water, ice, marine supplies, and sewage pump-out facilities. A 150-ton hoist is available for repairs. The city dock extends about 600 feet lakeward from the marina dock. In 1972, the city dock had depths of 17 feet along its outer end, 19 feet along the SW face, and 17 feet along the NE face. A launching ramp and a small dock are maintained by the city 0.9 mile W of the city dock.

Charts 14966, 14973.–From Houghton Point, the shore extends NNW for 4.3 miles, thence trends NE for 5 miles to Bayfield. Except near the mouths of streams, the shore is bold, and shoals extend no more than 0.3 mile off. Most of the reach is protected from the E by Long Island and Madeline Island.

Port Superior Village, Wis., is a village on the N side of **Pikes Bay,** 6.3 miles N of Houghton Point. A marina at the village is protected by a detached breakwater. The entrance to the marina is marked by private buoys and lights. Transient berths, gasoline, diesel fuel, water, electricity, marine supplies, and a launching ramp are available. Hoists to 25 tons are available for hull, engine, and electronic repairs.

Bayfield, Wis., a village about 15 miles N of Ashland, has a well-protected harbor used principally as a base for commercial fishing tugs and recreational craft and as a harbor of refuge for small craft. Ferries operate between this harbor and La Pointe on Madeline Island. **Bayfield Harbor South Breakwater Light** (46°48.6′N., 90°48.7′W.), 25 feet above the water, is shown from a white column with a square green daymark on the S side of the entrance to the S harbor basin; a fog signal is at the light.

The harbor comprises three basins formed by breakwaters that extend N and S from the city dock and from the shore N and S of the city dock. The entrance to the S basin is marked by lights on either side, and the entrance to the N basin is marked by a private light on the S side. In 1976, the controlling depth in the S basin was 10 feet. The N basin and the small E basin on the S side of the city dock have depths of 8 to 10 feet.

Caution.–Submerged dock ruins, covered 2 feet and marked at the outer end by a buoy, extend 550 feet from shore 0.9 mile SW of Bayfield Harbor South Breakwater Light.

Bayfield Coast Guard Station is on the S side of the city, about 1,000 feet SW of Bayfield Harbor South Breakwater Light.

The National Park Service headquarters of Apostle Islands National Lakeshore is at the old courthouse building.

Small-craft facilities.–A marina in the S basin provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, marine supplies, and a launching ramp. A 25-ton mobile hoist can handle 65-foot craft with a 17-foot beam for repairs. Berths and other facilities are available at several other docks SW of the basins.

From Bayfield the shore trends NNE for about 6 miles to **Red Cliff Point,** thence NW for about 8 miles to **Point Detour** (46°57.7′N., 90°51.8′W.), and thence SW for 13.5 miles to Cornucopia. The shore is generally bluff with several prominent points and bays. The shore in this stretch is generally deep-to and can safely be approached within 0.25 mile, except for shoals that connect the shore with York Island and Sand Island. These shoals are described with the Apostle Islands.

Buffalo Bay, a small indentation 3 miles NNE of Bayfield, is enclosed on the S side by **Roys Point.** Red Cliff is a small settlement on the hill overlooking the bay. A small-craft basin, protected by a breakwater, is on the W side of the bay. Private buoys mark the entrance to the basin, and a private light is on the end of the breakwater. A sunken wreck is 0.45 mile NE of the basin. **Red Cliff Bay** is a small indentation on the S side of Red Cliff Point, 2.3 miles N of Buffalo Bay. A sunken wreck is close to shore on the N side of the bay.

West Channel, a deepwater N approach to Bayfield and Chequamegon Bay, leads between Basswood Island and the mainland shore from Roys Point to Red Cliff Point. A lighted buoy on the E side of Red Cliff Point marks the turn into the channel.

Raspberry Bay, SE of Point Detour, is enclosed on the E by **Raspberry Point.**

The district office of **Apostle Islands National Lakeshore** is 1.8 miles SW of Point Detour on the S side of **Little Sand Bay.** In 1978, the L-shaped dock at the office had reported depths of 4 to 6 feet alongside. Transient berths and water are available.

Sand Point, about 5 miles WSW of Point Detour, and **Squaw Point,** 2 miles NNE of Cornucopia, are prominent.

The **Apostle Islands** are a group of about 20 wooded islands that in preglacial times were part of the peninsula that now terminates in Point Detour and Red Cliff Point. There are good deep passages around and between the islands of the group. The Apostle Islands, less Madeline Island and Eagle Island, are part of the Apostle Islands National Lakeshore. The boundary of the Lakeshore extends 0.25 mile from the shoreline of the individual islands.

Madeline Island, the southernmost and largest of the Apostle Islands, is 12 miles long NE and SW and 1 to 3.2 miles wide. A shoal with depths less than 6 feet extends 0.5 mile SW from the SW point of the island. The outer end of the shoal is marked by a lighted buoy. Shoals extend 0.1 to 0.5 mile off the S shore of the island. **Big Bay,** the large bight midlength of the S shore, has deep water within 0.1 mile of its head. Shoals extend off 0.9 mile around the E point of the island. The NW shore of the island is bold and has deep water within 0.25 mile. At **Point De Froid,** the NW point of the island, a shoal extends 0.4 mile W. The W shore of the island has deep water within 0.35 mile.

La Pointe Harbor serves the village of **La Pointe, Wis.,** a small old settlement and summer resort just S of Point De Froid at the W end of Madeline Island. A ferry operates between La Pointe and Bayfield.

Channels.–An L-shaped pier and breakwater extends from shore 0.4 mile S of Point De Froid to enclose a dredged small-craft basin on its SE side. The approach to the basin is from S. The outer end of the breakwater is marked by a light. A detached breakwater SW of the entrance channel is marked by a private light on each end. In 1981, the controlling depth was 7 feet through the entrance channel and in the basin except for shoaling to 3½ feet along the W edge of the entrance channel.

Small-craft facilities.–Gasoline by truck and water are available at the L-shaped pier. A marina basin 0.5 mile S is entered between breakwaters marked at the outer ends by private lights. Gasoline, diesel fuel, water, ice, electricity, sewage pump-out facilities, a launching ramp, and a 30-ton travelift are available for hull and engine repairs.

Basswood Island and **Hermit Island** are small bold islands about 2 miles NW of Madeline Island, SE and E of Red Cliff Point, respectively. Shoals extend about 0.2 mile off the shores of these islands. Berthing is available at a small-craft pier on the W side of Basswood Island.

Stockton Island, 2.5 miles N of the NE end of Madeline Island, is about 7.5 miles long and generally 2.5 miles wide. **Presque Isle Point** extends 1.5 miles S from the S side of the island. Shoals extend about 0.4 mile off the E end of the island, but decrease in width toward the W end, which is deep-to. Berthing is available at small-craft piers on the E side of **Presque Isle Bay** and on the N side of **Quarry Bay.**

Michigan Island is about 3 miles ENE of Madeline Island. **Michigan Island Light** (46°52.3'N., 90°29.8'W.), 170 feet above the water, is shown from a white cylindrical tower on the S point of the island. A shoal with a depth of 12 feet near the outer end extends 0.7 mile S from the point. The light should be given a berth of at least 1 mile. Shoals extend 0.2 to 0.5 mile off the remainder of the S shore and the entire N shore. The W point of the island is deep-to. A rocky ledge extends 1.4 miles NE from the NE point of the island. **Gull Island,** marked by a light, is near the middle of the ledge. Between the islands, the ledge is covered about 2 feet. **Gull Island Shoal,** a detached rocky patch with a least depth of 18 feet, is 3.6 miles NE of Gull Island.

Outer Island, the northeasternmost of the Apostle Islands, is 3 miles NE of Stockton Island. The island is about 6 miles long N and S and 2.5 miles wide with a sharp point at the SW end. **Outer Island Light** (47°04.6'N., 90°25.0'W.), 130 feet above the water, is shown from a white conical tower with attached dwelling at the N end of the island. A rocky bank extends 0.4 mile off the SW point and the SE shore of the island, narrowing to 0.1 mile off the E shore. A shoal extends 0.6 mile N from the NE point of the island. Shoals extend 0.7 mile off the NW shore and decrease to 0.15 mile wide S along the W shore. Shoals extend about 0.5 mile off the N shore. **Outer Island Shoal,** with a least depth of 16 feet, is connected to the shoal border and extends 1.2 miles N from the island. A sunken wreck is 1.5 miles NE of Outer Island Light. Berthing is available at a small-craft pier on the N side of the island.

Cat Island is 4.3 miles W of Outer Island and 2.4 miles N of Stockton Island. Shoals extend off 0.3 to 0.5 mile around the N end of the island and decrease to 0.15 mile wide toward the S end where a shoal extends 0.6 mile S.

North Twin Island is 1.7 miles NNW of Cat Island. Shoals extend 0.5 mile SW from the S point, 0.2 mile from the E side, and 0.2 to 0.4 mile from the N and W sides.

Rocky Island and **South Twin Island** are about 2.8 miles SW of North Twin Island. The islands are connected at their N ends by a rocky flat with an available depth of 10 feet. Shoals extend 0.4 mile from the N and S sides of Rocky Island, 0.2 mile from the W side, and 1.1 miles NE from the NE point. Shoals extend 0.4 mile from the S side of South Twin Island and 0.6 mile from the E side. The bay between the two islands affords good anchorage with protection from W and NW winds, mud bottom. Shoals extend 0.15 mile from the E and W shores of the bay, and deep water extends to just S of the N end of South Twin Island. Berthing is available at small-craft piers on the W side of South Twin Island and on the E side of Rocky Island S of the bay.

Ironwood Island is 1.6 miles SE of South Twin Island and 1.7 miles W of Cat Island. Shoals extend 0.2 to 0.4 mile off around the island. **Otter Island** is 0.9 mile S of Rocky Island. Shoals extend 0.4 mile off the E point of the island and 0.2 mile off the other shores. Berthing is available at a small-craft pier on the S side of the island.

Manitou Island is 1.1 miles SW of Ironwood Island and 1.3 miles N of Stockton Island. Deep water is within 0.2 mile of the shores of the island, except at the W end where a shoal extends 0.6 mile NW. **Little Manitou Island,** a small rocky islet marked by a light, is near the outer end of the shoal.

Oak Island, 2 miles NE of Red Cliff Point, is 4 miles long and 2.5 miles wide. Shoals extend no more than 0.3 mile from the island. **Oak Island Shoal,** with a least depth of 18 feet, is 0.9 mile N of Oak Island, in the middle of the deep passage between it and Otter Island. Berthing is available at a small-craft pier on the SW side of Oak Island.

Raspberry Island, 2 miles NW of Oak Island and 2.2 miles N of Raspberry Point, is marked on the SW side by a light. An abandoned lighthouse is about 100 feet N of the light. Shoals extend 0.1 to 0.3 mile from the island. **Marina Shoal** extends 0.4 mile S from the SE side. A buoy marks the outer edge of the shoal on the SW side of the island. Berthing is available at a small-craft pier on the SW side of the island.

Bear Island is 2.5 miles N of Oak Island. Shoals extend 0.6 mile from the NW side, 0.2 mile from the E and W sides, and 0.3 mile from the S side. **Bear Island Shoal,** a detached shoal with a least depth of 13 feet, is 2.2 miles WNW of Bear Island and about 1 mile NE of York Island Shoals.

Devils Island is 2.5 miles NNE of Bear Island. **Devils Island Light** (47°04.8'N., 90°43.7'W.), 100 feet above the water, is shown from a white cylindrical tower on the N end of the island. A fog signal and a radiobeacon are at the light. Shoals extend about 0.1 mile off the N, E, and W sides and 0.25 mile off the S end. **Devils Island Shoal,** a detached rocky spot with a least depth of 11 feet, is 1.3 miles E of the island. Berthing is available at a small-craft pier on the S side of the island.

York Island is about 1 mile N of Point Detour. A shoal extends about 0.6 mile S from the island and leaves a passage 0.3 mile wide with depths of 20 to 24 feet between the island and the mainland. Shoals extend about 0.5 mile off the SW side and 0.25 mile off the N and E sides of the island. **York Island Shoals** are a group of detached rocky spots with a least depth of 14 feet about 2 miles NNE of York Island. The main reef is about 1 mile long and 0.4 mile wide. Several 19- to 22-foot spots are close SE. A lighted bell buoy is off the W side at the N end of the reef. The deepwater channel between the southernmost shallow spot and York Island is about 1.4 miles wide.

Sand Island, 3.2 miles W of Point Detour and 1.4 miles N of Sand Point, is marked at the N end by a light. A shoal ridge with depths of 3 to 7 feet extends from the SE point of the island S to the mouth of **Sand River,** 1.8 miles SE of Sand Point. Shoals extend 0.6 mile off the E and N shores and 0.4 mile off the W shore. **Sand Island Shoals,** with a least depth of 14 feet, extend from 0.5 mile E of **Swallow Point,** the E point of Sand Island, N for 1.5 miles. The N end of the shoals is marked by a buoy. A sunken wreck is on the E side of the shoals. Berthing is available at a small-craft pier in **East Bay.**

The N approach to West Channel leads between Sand Island Shoals and York Island Shoals, and thence between York Island and Raspberry Island.

Eagle Island, 3.2 miles W of Sand Point, is the westernmost of the Apostle Islands. Shoals extend about 0.25 mile off the W, N, and E sides of the island. Shoals extend 0.5 mile S and 0.8 mile SSE from the island. Near the inner end of these shoals, a gravel and boulder ledge, formerly a small island, is visible during storms and low water conditions. **Eagle Island Shoals,** centered about 1.5 miles SW of Eagle Island, has a least depth of 11 feet.

Chart 14966.–Cornucopia, Wis., is a small-craft harbor at the mouth of **Siskiwit River** on the SE side of **Siskiwit Bay,** about 13.5 miles SW of Point Detour. The harbor is a base for commercial fish tugs and a refuge for recreational craft.

Channels.–A dredged entrance channel leads SE from deep water in Lake Superior between two piers to an inner basin which connects two inner channels that lead E and SW. The outer end of the E pier is marked by a light. In May 1984, the controlling depths were 6 feet in the N half of the approach channel, thence 8 feet between the piers, thence 3½ feet in the E channel and 7 feet in the SW channel except for shoaling along the edges. Siskiwit River is not navigable above the dredged basin.

Small-craft facilities.–A dock in the SW basin arm provides transient berths, gasoline, electricity, and a launching ramp. Other services are available nearby in the village.

From Cornucopia SW for about 14 miles to Port Wing, the shore is relatively bold and can be approached within 0.5 mile, except at Bark Point where shoals extend 0.8 mile NE. **Bark Point** (46°53.1'N., 91°11.1'W.) encloses the W side of **Bark Bay.** The bay has fair holding ground with protection from all but NE winds. **Roman Point** encloses the E side of Bark Bay and separates it from Siskiwit Bay.

Herbster, Wis., is a small settlement at the mouth of **Cranberry River,** 5.2 miles SW of Bark Point. In 1983, the wharf at the village was in ruins.

Port Wing, Wis., is a village and small-craft harbor at the mouth of **Flag River,** about 28 miles SW of Point Detour and 34 miles E of Duluth. The harbor is used by commercial fish tugs and recreational craft.

Channels.–A dredged entrance channel leads from deep water in Lake Superior between parallel piers to an inner basin which connects with two inner channels that lead E inside the shoreline and S into the Flag River. The outer end of the E pier is marked by a light. In June 1985, the controlling depths were 7 feet in the approach channel, thence 6½ feet between the piers, thence 8½ feet in the N part of the inner basin and 6 to 1½ feet in the S part, thence 5½ feet in the E inner channel, and thence in 1972, 3 feet in the S inner channel. The S channel is subject to severe shoaling from drifting sand.

Small-craft facilities.–Transient berths and a launching ramp are available in the harbor. Gasoline and diesel fuel must be obtained from stations in the village, 1 mile away.

From Port Wing, the shore trends generally WSW for about 31 miles to Superior Entry of Duluth-Superior Harbor. The shore is relatively low and can be approached to within 0.8 mile, except for a point about 7 miles W of Port Wing where shoals extend over 1 mile from shore. None of the streams that flow into the lake in this stretch are navigable.

Charts 14966, 14975.–Duluth-Superior Harbor is at the W end of Lake Superior. The harbor has been developed along Superior Bay and the lower part of the St. Louis River, which forms part of the **State boundary** between Wisconsin and Minnesota. It is one of the most important harbors on the Great Lakes because of its range of facilities and the magnitude of its commerce. The cities of **Superior, Wis.,** and **Duluth, Minn.,** front the S and N sides of the harbor, respectively.

Prominent features.–Duluth is built on the side of a steep bluff that reaches over 500 feet above the lake, and the city is visible for a long distance out in Lake Superior. Enger Memorial, a lighted stone tower on a hill overlooking the city, is prominent, as are radio and television masts N of it. Grain elevators on Rices Point and Duluth Ship Canal Bridge are also prominent.

Superior is built on lower ground and is relatively less prominent from the lake. The ore docks opposite Superior Entry and the grain elevators 1 mile NW and on the SW side of Howards Bay are prominent.

Superior Entry South Breakwater Light (46°42.6'N., 92°00.4'W.), 70 feet above the water, is shown from a white cylindrical tower on a white building on the outer end of the breakwater on the S side of the S harbor entrance. A fog signal and a radiobeacon are at the light.

Duluth Harbor South Breakwater Inner Light (46°46.7'N., 92°05.5'W.), 68 feet above the water, is shown from a black cylindrical tower with a white lantern room on the S side of the N harbor entrance.

Superior Bay, about 6.5 miles long and 0.5 to 1 mile wide, is a natural shallow basin separated from Lake Superior by **Minnesota Point,** a low, narrow strip of sand and gravel. The bay is entered from Lake Superior through **Duluth Ship Canal** at the N end of Minnesota Point and through **Superior Entry** at the S end of the point. Between the entrances, the lakeside of Minnesota Point has deep water within 0.4 mile. A submerged breakwater extends 1,000 feet S from shore in the small bight on the N side of Duluth Ship Canal. A buoy marks the outer end of the ruins. Several cribs are on the W side of the bight.

Allouez Bay is a very shallow bay that extends SE from Superior Bay S of Superior Entry and is enclosed on the E by **Wisconsin Point.**

Nemadji River flows from **Moosecamp Lake,** about 40 miles above Superior, and empties into the W side of Superior Bay opposite Superior Entry. In October 1982, a depth of 4½ feet was available for 5 miles above the mouth, thence in 1976, 2 feet above that point.

St. Louis River flows into the W side of Superior Bay near its N end through a narrow gap between **Rices Point** on the N and **Connors Point** on the S. **St. Louis Bay** is a widening in the river that extends from these points to **Grassy Point,** 3 miles SW. **Howards Bay** is a narrow inlet that leads SE from St. Louis Bay for 1 mile on the W side of Connors Point.

Above Grassy Point, the river again widens, covers a large shallow area, and is divided by points and islands into a number of irregularly shaped bays and inlets. **Clough Island,** the largest in this area, encloses the N side of **Spirit Lake,** a section of the river mostly isolated by islands. **Minnesota Channel,** the dredged channel through this area, follows the Minnesota shore for 2 miles W from Grassy Point, thence turns S between Clough Island and the mainland, and thence turns E on the S side of Clough Island to the head of the dredged channel.

About 1.5 miles W of Grassy Point, a small-craft channel with a controlling depth of about 3 feet extends S from Minnesota Channel, and on the E side of Clough Island, joins a curving natural channel that leads S to join with the natural channel of St. Louis River SE of Clough Island.

Above Clough Island, the natural channel of the St. Louis River is navigable for varying drafts to just above **Fond du Lac,** about 8 miles above Clough

Island. The river is practically a level pool at ordinary stages to the foot of the rapids just above Fond du Lac. The channel in this reach is well marked by buoys, and vessels of suitable draft should have no difficulty navigating it. A wreck, covered about 2½ feet, is on the E side of the river at **Oliver,** about 3.8 miles above Clough Island.

At Fond du Lac, a mud island and shoal extends off the mouth of Mission Creek. A very narrow channel along the S shore affords access for about 7 feet draft to the river above the creek. The distance from the Burlington Northern Railway bridge at Grassy Point to Fond du Lac is about 13.2 miles by the main channel and about 11.8 miles by the cut-off channels.

Channels.–One Federal project encompasses Duluth-Superior Harbor. Channels have been dredged in Superior Entry, Duluth Ship Canal, Superior Bay, Allouez Bay, Howards Bay, St. Louis Bay, and St. Louis River as far as the S side of Clough Island.

Superior Harbor is entered from deep water in Lake Superior between converging breakwaters and parallel piers to the S end of Superior Bay. The outer ends of the breakwaters and piers are marked by lights. Federal project depths are 31 to 27 feet in Superior Entry, thence 27 feet in Superior Harbor Basin and anchorage area, Allouez Bay Channel, and Superior Front Channel. (See Notice to Mariners and latest editions of charts for controlling depths.)

Duluth Harbor is entered from deep water in the lake between parallel piers to the N end of Superior Bay. The outer ends of the piers are marked by lights; a fog signal and a radiobeacon are at the S light. **Duluth Harbor Basin Traffic Lighted Buoy,** 0.45 mile SW of Duluth Harbor South Breakwater Inner Light, should be left to starboard by all inbound and outbound vessels except those proceeding to or from the docks on the NW side of the basin, in which cases the regular navigation rules apply. Federal project depths are 32 to 28 feet in Duluth Ship Canal, 28 to 27 feet in Duluth Harbor Basin and anchorage area, and 27 feet in East Gate Basin. (See Notice to Mariners and latest editions of charts for controlling depths.)

In St. Louis Bay and River the Federal project depths are 27 feet in West Gate Basin and Howards Bay channel, 27 feet in North Channel E section and 21 feet in the W section, 20 feet in 21st Avenue West Channel, 27 feet in South Channel E section and Cross Channel, 23 feet in South Channel W section and Upper Channel, and 23 feet in Minnesota Channel E section with 20 feet in the W section. (See Notice to Mariners and latest editions of charts for controlling depths.)

All the dredged channels in the harbor are well marked by lighted and unlighted buoys and lighted ranges.

Vessels drawing more than 16 feet are cautioned against navigating within 50 feet of piers at Superior Entry because of stone riprap.

In Duluth Ship Canal vessels drawing more than 20 feet should not navigate within 20 feet of the piers because of stone riprap.

Anchorages.–Two deep-draft anchorages in Superior Bay, one in the SE corner of Duluth Harbor Basin and one in the N corner of Superior Harbor Basin, are marked by lighted and unlighted buoys. The Duluth Harbor Basin anchorage has fair to good holding ground but is narrow and presents problems in E or W winds. Vessels awaiting berths at Duluth frequently anchor E of Duluth Harbor South Breakwater Outer Light. The Superior Harbor Basin anchorage is subject to shoaling at the S end, and a submerged pipeline crosses the NW end of the anchorage.

A special anchorage is on the E side of Superior Bay SE of **Hearding Island.** (See **33 CFR 110.1 and 110.77a,** chapter 2, for limits and regulations.)

Caution.–A sunken wreck is 0.9 mile ENE of the entrance to Duluth Ship Canal.

The area immediately ESE of Duluth Harbor Basin Traffic Lighted Buoy is subject to shoaling.

Local magnetic disturbance.–Differences from normal variation of from 001°E to 005°E have been observed in the lake about 10 miles from Duluth.

Currents.–Currents resulting from fluctuations of the water level of Lake Superior are prevalent in Duluth Ship Canal. The currents set in or out of the canal as the lake rises or falls and are usually of moderate strength and short duration. On rare occasions, a large seiche will produce a current of up to 6 mph for a few minutes, followed by a reverse current perhaps equally strong. The stronger currents cause some inconvenience to navigation, but nothing serious unless accompanied by storms.

When a current setting out of the canal meets a heavy sea from the NE, it increases the wave height, creating a choppy and turbulent sea and making entrance by vessels somewhat difficult and dangerous. Instances have been reported of vessels being thrown against the piers under these conditions. In ordinary storms, however, this danger seems to be slight, and failure to make the entrance has been rare.

Currents frequently set through Superior Entry, usually simultaneous with and in the same direction as those at Duluth Ship Canal. However, they are usually of less velocity, due to the greater length of the canal and the consequent smaller degree of slope for any difference of water level between the lake and harbor.

Caution.–A flashing amber signal light on the W side of the fixed span of Duluth Ship Canal bridge is operated by the city of Duluth for the purpose of warning outbound vessels within Duluth Harbor Basin of the approach from Lake Superior of inbound vessels exceeding 300 gross tons and barges or scows exceeding (light) 100 displacement tons. The light is not intended to regulate traffic, but to assist outbound vessels in complying with the regulation which prohibits the passing in Duluth Ship Canal by vessels of the sizes mentioned and noted in **33 CFR 162.110.** (See chapter 2.) Subject to mechanical failure or reasons beyond control, the bridge

Structures across Duluth-Superior Harbor, St. Louis River, and Nemadji River

**Miles above Duluth Harbor North Pier Light*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above Low Water Datum	Remarks
				Right	Left	Center		
1	Duluth Ship Canal bridge	Highway	0.25			300	15	Vertical lift. Clearance up 141 feet. Notes 1 and 3.
	St. Louis Bay and River							
2	Burlington Northern Ry. bridge	Railroad	2.70			200	20	Bascule. Note 2. Being removed in 1984.
3	John A. Blatnik (I-535) bridge	Highway	2.74			460	123	Fixed.
4	I-535 bridge (Howards Bay)	Highway				150	103	Fixed.
5	Burlington Northern Ry. (North Channel) bridge	Railroad	3.15	175	175		16	Swing. Notes 2 and 7.
6	Burlington Northern Ry. (South Channel) bridge	Railroad	3.17	175	175		14	Swing. Notes 2 and 7.
7	Arrowhead Bridge	Highway	5.17			400	120	Fixed. Under construction 1980. Note 6.
8	Burlington Northern Ry. (Grassy Point) bridge	Railroad	5.44	175	175		12	Swing. Notes 2 and 4.
9	Overhead cable	Power	5.73				143	
10	Arrowhead Bridge	Highway	6.16			211	33	Bascule. Note 2.
11	Duluth, Missabe & Iron Range Ry. (Oliver) bridge	Highway & Railroad	13.91	125	125		22	Swing. Note 2.
12	Overhead cable	Telephone	18.99				24	
13	Fond du Lac bridge	Highway	19.00			116	23	Fixed.
	Nemadji River							
14	Overhead cable	Telephone	0.32				13	Note 5.
15	Burlington Northern Ry. bridge	Railroad	0.33			59	10	Fixed.
16	Overhead cable	Telephone	0.44				9	
17	U.S. Route 2 bridge	Highway	0.45			25	9	Fixed.
18	Overhead cable	Power	0.46				34	
19	Overhead cable	Telephone	1.20				26	
20	Chicago & North Western Ry. bridge	Railroad	1.21			70	26	Fixed.
21	Overhead cable	Power	1.85				15	
22	Bardon Ave. bridge	Highway	5.00			16	11	Fixed.
23	Soo Line Ry. bridge	Railroad	7.40				23	Fixed.

Note 1.–See **33 CFR 117.1 through 117.59 and 117.661**, chapter 2, for drawbridge regulations.

Note 2.–See **33 CFR 117.1 through 117.59, 117.669, and 117.1083**, chapter 2, for drawbridge regulations.

Note 3.-With the bridge in the down position, the vertical clearance is 16 feet for the center 192 feet of the span reducing to 14 feet at the ends of the span. The bridgetender monitors VHF-FM channel 16 (156.80 MHz), and works on channels 10 (156.50 MHz), 12 (156.60 MHz), 13 (156.65 MHz), and 68 (156.425 MHz); call sign, KAN-388.

Note 4.-Fixed spans adjoining each end of the draw span, outside the channel limits, have a horizontal clearance of 64 feet and a vertical clearance of 13 feet.

Note 5.-Mileages in Nemadji River are above the river mouth.

Note 6.-Upon completion, the bridge will replace the existing Arrowhead Bridge at mile 6.16.

Note 7.–In October 1984, maintained in the open position.

operators will cause the amber light to commence flashing when, in their opinion, a vessel or craft of the tonnage above stated will enter Duluth Ship Canal from Lake Superior within 15 minutes, the flashing to continue until the incoming vessel has cleared the canal. Masters are cautioned that the signal light does not relieve them of responsibility to observe the passing regulation or of any other responsibility inherent in their duties relating to maneuvering, signaling, or other functions.

Weather.–(See page T-15 for **Duluth climatological table.**)

Towage.–Tugs to 1,250 and 1,200 hp are available from Great Lakes Towing Co., and North American Towing Co., respectively. Arrangements for the Great Lakes Towing Co. tugs are made through the dispatcher in Cleveland at 800-321-3663 or on VHF-FM channels 16 (156.80 MHz), 10 (156.50 MHz), 12 (156.60 MHz), and 18A (156.90 MHz) via remote antenna. The tugs' VHF-FM channels include 16; 6 (156.30 MHz); 12; 14 (156.70 MHz); and 18A. The North American Towing Co. dispatcher is reached at 218-722-1852 or on VHF-FM channels 16 and 14. The tugs can be contacted initially on VHF-FM channel 16. Vessels are usually met inside the harbor, but during adverse winds they are met outside the entrance to Duluth Ship Canal.

Duluth and Superior are **customs ports of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.) A total of six modern hospitals are in Duluth and Superior.

Coast Guard.–Duluth Coast Guard Station is on the W side of Minnesota Point, 0.5 mile S of Duluth Ship Canal. A Coast Guard **Marine Safety Office** is in Duluth. (See appendix for address.)

Harbor regulations.–A **speed limit** of 8 mph (7 knots) is enforced in Duluth-Superior Harbor. (See **33 CFR 162.110,** chapter 2, for harbor regulations.)

Wharves.–Duluth-Superior Harbor is well equipped with facilities for handling all types of cargo. The major commodities handled in the port are grain, iron ore, coal, limestone, cement, and general cargo. Only the deep-draft facilities are here described. (For complete information on the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operator.) Water, electrical shore-power, rail, and highway connections are available at many of the wharves and docks in the harbor.

Facilities in Superior Bay at Duluth:

Huron Cement Duluth Plant Dock: (46°46'35"N., 92°06'10"W.); 345-foot face; 22 feet alongside; deck height, 4 feet; silo storage for 21,000 tons of cement; receipt of cement; owned and operated by Huron Cement, Division of National Gypsum Co.

Cutler-Magner Co., Salt Plant Pier: (46°46'29"N., 92°06'28"W.); 690-foot face; 21 feet alongside; deck height, 6 feet; one traveling bridge crane, unloading rate 200 tons per hour; storage for 183,000 tons of salt; receipt of granulated and rock salt; owned and operated by Cutler-Magner Co.

Great Lakes Storage and Contracting Co., Dock No. 2: (46°46'23"N., 92°06'25"W.); 1,600 feet of berthing space; 24 feet alongside; deck height, 6 feet; 117,000 square feet covered storage; 10,000 square feet open storage; receipt and shipment of general cargo; owned and operated by Great Lakes Storage and Contracting Co.

General Mills Elevator A Wharf: (46°46'15"N., 92°06'32"W.); 1,900-foot face; 27 feet alongside; deck height, 6 feet; grain elevator, capacity over 3½ million bushels; three vessel-loading spouts, combined average rate 30,000 bushels per hour; shipment of grain; owned by Burlington Northern, Inc. and operated by General Mills, Inc.

Cargill Elevator B Dock: (46°46'05"N., 92°06'19"W.); 1,000 feet of berthing space along N face and along S face; 27 feet alongside; deck height, 5 to 6 feet; 9½-million-bushel grain elevator; gantry and spout loading systems; shipment of grain; owned and operated by Cargill, Inc.

Hallett Dock No. 3: across slip S of Cargill Elevator B Dock; 2,080-foot face; 23 feet alongside; deck height, 5 feet; two traveling bridge cranes, combined unloading rate 750 tons per hour; open storage for 500,000 tons of coal; receipt of coal, stone, and salt; owned and operated by Hallett Dock Co., Inc.

Capitol Elevator Co. Dock: (46°45'48"N., 92°06'16"W.); 1,736 feet of berthing space; 27 feet alongside; deck height, 6 feet; grain elevator, capacity over 3¾ million bushels; 12 vessel-loading spouts; shipment and occasional receipt of grain; owned and operated by International Multifoods Corp.

Hyman Michaels Co. Dock: S side of Capitol Elevator Co. Dock; 1,586-foot face; 26 feet alongside; deck height, 6 feet; open storage for 75,000 tons of material; cranes to 50 tons; shipment of ferrous scrap metal; owned and operated by Hyman Michaels Co.

Cargill Elevator C Dock: across slip S of Hyman Michaels Co. Dock; 1,180 feet of berthing space; 27 feet alongside; deck height, 5 feet; 4½-million-bushel grain elevator; five vessel-loading spouts, 60,000 bushels per hour; shipment of grain; owned and operated by Cargill, Inc.

Arthur M. Clure Public Marine Terminal: (46°45'26"N., 92°05'45"W.); 1,595-foot N face, 2,200-foot E face, 564-foot SE face, 1,392-foot S face; 30 feet alongside; deck height, 8 feet; two 90-ton gantry cranes, 150 tons in tandem; 35-ton mobile crane and 30-ton container crane; 300,000 square feet covered storage; 20,000 square feet refrigerated storage; 325,000 square feet paved and unlimited unpaved open storage; tank storage for over 1½ million gallons; receipt and shipment of edible and commercial grade fats and oils and general cargo; owned by Seaway Port Authority of Duluth and operated by Ceres, Inc. and Mid-Continent Warehouse Co.

St. Lawrence Cement Wharf: (46°45'08"N.,

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92°05'51"W.); 700 feet of berthing space; 27 feet alongside; deck height, 8 feet; 43,000-ton cement elevator; vessel unloading tower with unloading rate of 675 tons per hour; receipt of cement; owned by Seaway Port Authority of Duluth and operated by St. Lawrence Cement, Inc.

Facilities in St. Louis Bay at Duluth:

Duluth, Missabe and Iron Range Railway, Ore Dock No. 6: 1.3 miles W of SW point of Rices Point; 1,800-foot NE face, 2,304-foot SW face; 28 feet alongside; deck heights, low deck 6 feet, top deck 84½ feet; 400-ton ore pockets, 128 on NE side and 192 on SW side, each fitted with gravity spout for loading vessels; 2¾-million-ton open storage area; shipment of iron ore and iron ore pellets; owned and operated by Duluth, Missabe and Iron Range Railway.

Duluth, Missabe and Iron Range Railway, Ore Dock No. 5: immediately SW of Ore Dock No. 6; 2,304 feet of berthing space along ore pockets on NE and SW sides; 28 feet alongside; deck heights, low deck 6 feet, top deck 80½ feet; 384 300-ton ore pockets, each fitted with gravity spout for loading vessels; shipment of iron ore and iron ore pellets; owned and operated by Duluth, Missabe and Iron Range Railway.

Hallett Dock No. 5: across slip SW of Duluth, Missabe and Iron Range Railway, Ore Dock No. 5; 2,373-foot face; 27 feet alongside; deck height, 5 feet; 18-ton traveling bridge crane; open storage for 550,000 tons; covered storage for 45,000 tons of fertilizer; receipt of miscellaneous bulk materials including coal and fertilizer; owned and operated by Hallett Dock Co., Inc.

Facilities in St. Louis River W of Grassy Point:

C. Reiss Coal Co. Duluth Dock: 0.2 mile W of Grassy Point; 2,854-foot face; 23 feet alongside; deck height, 4 feet; two traveling bridge cranes, unloading rate for coal 350 tons per hour; open storage for 800,000 tons of material; receipt of coal, limestone, and miscellaneous materials; owned and operated by C. Reiss Coal Co.

Duluth Dock and Transport Co. Dock: 0.6 mile W of Grassy Point; 2,000-foot face; 24 feet alongside; deck height, 4 feet; two 25-ton cranes; gravity spout for grain loading, 12,000 bushels per hour; open storage for 500,000 tons of material; covered storage for 125,000 tons of grain; shipment of grain; receipt of rock salt; receipt and shipment of miscellaneous bulk materials; owned and operated by Duluth Dock and Transport Co., Inc.

Hallett Dock No. 6: 0.9 mile W of Grassy Point; 2,060-foot face; 23 feet alongside; deck height, 5 feet; two 18-ton traveling bridge cranes; open storage for 600,000 tons of material; tank storage for over 3¼ million gallons; receipt of miscellaneous bulk materials and liquid urea; owned and operated by Hallett Dock Co., Inc.

Facilities in St. Louis Bay at Superior:

Standard Oil Dock: W side of slip 0.9 mile WSW of Connors Point; 550 feet of berthing space; 21 feet alongside; deck height, 4 feet; tank storage for 758,000 barrels; receipt of petroleum products; owned and operated by Standard Oil, Division of Amoco Oil Co.

Superior Midwest Energy Terminal: 0.6 mile WSW of Connors Point; 1,200 feet of berthing space; 27 feet alongside; deck height, 11 feet; open storage for 7 million tons of coal; shipment of coal; owned and operated by Orba Corp. and C. Reiss Coal Co.

Burlington Northern Grain Elevator No. 5 Dock: E side of slip 0.4 mile WSW of Connors Point; 1,800-foot face; 27 feet alongside; deck heights, 9 and 13 feet; grain elevators with 12½-million bushel capacity; four vessel-loading spouts, average rate 60,000 bushels per hour; shipment of grain; owned by Burlington Northern, Inc. and operated by Archer-Daniels-Midland Co.

Globe Elevator Dock: E side of slip 0.2 mile WSW of Connors Point; 620 feet of berthing space; 27 feet alongside; deck height, 4 feet; 4½-million-bushel grain elevators; three vessel-loading spouts; one marine leg; shipment and occasional receipt of grain; owned by Chicago and North Western Transportation Co. and operated by F. H. Peavey and Co., a division of ConAgra.

Facilities in Howard Bay:

Farmers Union Grain Terminal No. 1 Elevator Dock: center section E side of slip 0.3 mile SE of Globe Elevator Dock; 700 feet of berthing space; 24 feet alongside; deck height, 6 feet; capacity of grain elevators at three Farmers Union Grain Terminal docks on W side of Howards Bay is over 19 million bushels; five vessel-loading spouts; one marine leg; shipment and occasional receipt of grain; owned and operated by Farmers Union Grain Terminal Association.

Farmers Union Grain Terminal No. 1 Gallery Dock: outer section E side of slip 0.3 mile SE of Globe Elevator Dock; 600 feet of berthing space; 30 feet alongside; deck height, 6 feet; five vessel-loading spouts; shipment of grain; owned and operated by Farmers Union Grain Terminal Association.

Farmers Union Grain Terminal No. 2 Hughitt Slip Dock: W side of slip 0.4 mile SE of Globe Elevator Dock; 1,250 feet of berthing space; 27 feet alongside; deck height, 5 feet; six vessel-loading spouts; one marine leg; shipment and occasional receipt of grain; owned and operated by Farmers Union Grain Terminal Association.

Facilities in Superior Bay at Superior:

Great Lakes Storage and Contracting Co. Dock: (46°44'20"N., 92°05'06"W); 1,059-foot face; 24 feet alongside; deck height, 5 feet; 260,000 square feet covered storage; 10 acres open storage; shipment of grain; receipt and shipment of general cargo and occasionally steel products; owned and operated by Great Lakes Storage and Contracting Co.

Continental Grain Dock: (46°44'17"N., 92°04'53"W.); 790-foot face; 30 feet alongside; deck height, 4 feet; 5-million-bushel grain elevator; six vessel-loading spouts; shipment of grain; owned by Continental Grain Co. and Northwest Leasing Co. and operated by Continental Grain Co.

CLM Limestone Dock: S side of slip 0.45 mile SE of Continental Grain Dock; 1,250-foot face; 24 feet alongside; deck height, 6 feet; traveling bridge crane, unloading rate 425 tons of limestone per hour; open storage for 500,000 tons of limestone and coal; receipt of limestone and coal; owned and operated by CLM Corp.

Huron Cement Dock: 0.55 mile SE of Continental Grain Dock; 1,186-foot face; 26 feet alongside; deck height, 5 feet; open storage for 150,000 tons of cement clinker; silo storage for 8,000 tons of cement; receipt of cement clinker, gypsum, and cement; owned and operated by Huron Cement, Division of National Gypsum Co.

Burdick Grain Co. Elevator M Dock: (46°42'40"N., 92°02'44"W.); 800 feet of berthing space; 28 feet alongside; deck height, 5 feet; grain elevator with 2¼-million-bushel capacity; two vessel-loading spouts; shipment of grain; owned and operated by Burdick Grain Co., a Division of ConAgra.

Burlington Northern, Ore Dock No. 1: (46°42'00"N., 92°01'29"W.); 2,244 feet of berthing space along ore pockets on W and E sides; 27 feet alongside; deck heights, low deck 6 feet, top deck 81 feet; 374 300-ton ore pockets, each fitted with gravity spout for loading vessels; open storage for over 7¼ million tons of pellets; shipment of iron ore pellets and occasionally iron ore; owned and operated by Burlington Northern, Inc.

Burlington Northern, Ore Dock No. 2: immediately E of Ore Dock No. 1; 2,100 feet of berthing space along ore pockets on W and E sides; 27 feet alongside; deck heights, low deck 6 feet, top deck 81 feet; 350 300-ton ore pockets, each fitted with gravity spout for loading vessels; shipment of iron ore; owned and operated by Burlington Northern, Inc.

Burlington Northern, Ore Dock No. 4: 0.1 mile E of Ore Dock No. 2; 1,812 feet of berthing space along ore pockets on W and E sides; 25 feet alongside; deck heights, low deck 6 feet, top deck 75 feet; 302 300-ton ore pockets, each fitted with gravity spout for loading vessels; shipment of iron ore and potash; owned and operated by Burlington Northern, Inc.

Burlington Northern, Taconite Dock: 0.15 mile E of Ore Dock No. 4; 1,500-foot face; 28 feet alongside; deck height, 4 feet; open storage for over 5 million tons of material; 18 shuttle conveyors have a combined vessel-loading rate of 13,000 tons per hour; shipment of iron ore pellets; owned and operated by Burlington Northern, Inc.

Supplies.–Marine supplies, provisions, Bunker C and diesel oils by barge and tank truck, potable water, and other supplies are available at Duluth and Superior.

Foreign-Trade Zone No. 5 is in Duluth. (See chapter 1, Foreign-Trade Zones, and appendix for address.)

Repairs.–Two companies in the harbor have docking facilities for making repairs to deep-draft vessels, and three other companies have shops and make repairs to vessels at their berths. Fraser Shipyard, Inc., at the head of Howards Bay, has three graving docks. The largest has a length of 800 feet on the keel blocks and 831 feet overall, a width of 85 feet at the top of the entrance and 80 feet at the keel blocks, and a depth of 18½ feet over the sill. Repairs of all types are made at these docks. Cranes to 120 tons are available. Shafts to 36 feet long can be produced.

Small-craft facilities.–Small-craft facilities are on the NE side of Duluth Harbor Basin, on the W side of Minnesota Point 0.5 mile S of Duluth Ship Canal, on Barkers Island 1.6 miles NW of Superior Entry, at the N end of Duluth Harbor Basin in the slip NE of the Duluth Arena-Auditorium, and on the W side of the river opposite Clough Island. The marina on Minnesota Point provides transient berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and most marine supplies. A 50-ton mobile hoist can handle 70-foot craft with a 19-foot beam and a draft of 7 feet for complete hull, engine, and electronic repairs.

A marina on Barkers Island has berths, gasoline, diesel fuel, water, electricity, a launching ramp, and marine supplies. A mobile hoist can handle craft to 30 tons for complete hull and engine repairs. In September 1982, 8½ feet was reported in the entrance channel and alongside the docks. The entrance channel is marked by private lights and lighted and unlighted buoys.

Communications.–Duluth and Superior have good highway and rail connections. Duluth International Airport is 7 miles W of the harbor.

Chart 14966.–From Duluth Ship Canal NE for 18.5 miles to Knife River, the shore is bold and rocky. Deep water is within 0.25 mile of shore. **Stony Point** (46°55.5'N., 91°49.0'W.), 2.5 miles SW of Knife River, is prominent. A lighted red and white checkered tank on high ground 3 miles W of Stony Point is prominent.

Local magnetic disturbance.–Differences from normal variation of from 002°W to 018°E have been observed in the vicinity of Stony Point.

Knife River, Minn., is a village just above the mouth of **Knife River,** 18.5 miles NE of Duluth Ship Canal. A small-craft harbor, used principally by recreational craft, is 0.4 mile S of the river mouth on the N side of **Granite Point.**

Knife River is not navigable. An offshore dock on the S side of the river mouth is in ruins, hazardous, and useless for dockage. **Knife Island** is 0.3 mile SE of the river mouth. A shoal with rocks awash extends about 950 feet WSW from the island to within about 500 feet of Granite Point. The rest of the island can be approached within about 350 feet.

Knife River Harbor Entrance Light (46°56.6'N., 91°46.6'W.), 20 feet above the water, is shown from a white column with a square green daymark on the outer end of the breakwater at Granite Point.

Channels.–A breakwater that extends from Granite Point protects the entrance to the harbor from the SE. A dredged entrance channel leads from deep water in Lake Superior on the N side of the breakwater to an inner channel about 0.2 mile long. In May 1985, the controlling depths were 8½ feet in the entrance channel, thence 7½ feet at midchannel in the inner channel to the upstream limit of the project.

Small-craft facilities.–A county-owned marina in the small-craft harbor provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 20-ton hoist is available for hull and engine repairs. The marina monitors VHF-FM channel 16 (156.80 MHz).

From the mouth of Knife River, the shore extends NE for 7 miles to Two Harbors and is deep-to. No landings are in this stretch. A rounded promontory about 200 feet high forms the W side of Agate Bay on which Two Harbors is located. A lighted radio mast on the promontory and two tanks and a stack NNE of town are prominent.

Two Harbors, Minn., is a town about 7 miles NE of Knife River on the N side of **Agate Bay,** a natural indentation about 0.75 mile long and 0.5 mile wide. Two Harbors is an important ore shipping point, and the bay is a harbor of refuge.

Two Harbors Light (47°00.8'N., 91°39.7'W.), 78 feet above the water, is shown from a red square tower on a dwelling on the E point of the harbor; a radiobeacon is at the light.

Prominent features.–Pork City Hill, (47°00'45"N., 91°41'15"W.) and **Silver Cliff,** (47°04'10"N., 91°35'30"W.) are excellent radar targets when approaching Two Harbors.

Channels.–The harbor is entered from Lake Superior N between a detached breakwater on the W side and a breakwater that extends SW from the E point of the harbor. The outer ends of the breakwaters are marked by lights; a fog signal is at the E light. A maneuvering area has been dredged in the E part of the harbor. Buoys mark the N and E limits of the area. In 1981, the controlling depth was 27 feet, except for shoaling to 17 feet along the SE limit of the project.

Towage.–Tugs are available from Duluth. (See Towage under Duluth.)

Wharves.–Two Harbors has two deep-draft facilities on the W side of Agate Bay. (For a complete description of the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the operator.) The facilities described have highway and rail connections.

Duluth, Missabe and Iron Range Railway, Ore Dock No. 1: 1,600 feet NE of W breakwater light; 1,406 feet of berthing space along NE and SW sides; 28 feet alongside; deck heights, low deck 6 feet, top deck 75 feet; 224 250-ton ore pockets, each fitted with gravity spout for loading vessels; open storage for 2 million tons of material; shipment of iron ore and iron ore pellets; bunkering of vessels; owned and operated by Duluth, Missabe and Iron Range Railway Co.

Duluth, Missabe and Iron Range Railway, Ore Dock No. 2: immediately SW of Ore Dock No. 1; 1,432 feet of berthing space along NE and SW sides; 28 feet alongside; deck heights, low deck 6 feet, top deck 80 feet; 228 300-ton ore pockets, each fitted with gravity spout for loading vessels; tank storage for 1,500 barrels of diesel oil and 12,000 barrels of Bunker C; shipment of iron ore and iron ore pellets; bunkering of vessels including coal; owned and operated by Duluth, Missabe and Iron Range Railway Co.

Small-craft facilities.–Paved launching ramps are available in the harbor and gasoline and supplies are available nearby. Ruins of fishing docks and foul bottom are along the E side of the harbor basin. Caution is advised in the area. Ruins covered 5 feet are on the N side of the W end of the W breakwater.

From Two Harbors, the shore is bold for 27 miles NE to Silver Bay Harbor. There is little shelter along this stretch, and several dangers are close to the shore.

Local magnetic disturbance.–Differences from normal variation of about 007°E have been observed near **Talmadge River** and **French River,** about 12 miles NE of Duluth.

Burlington Bay, 1 mile NE of Agate Bay, is about 1 mile wide and indents the shore about 0.6 mile. The bay is protected from SW winds by the point of land that separates it from Agate Bay, but is subject to wash from that direction. The bay is partially protected from NE storms by the E point of land, but those storms can be so severe, with waves of such great fetch, that the sea rolls into the bay and makes it unsafe for vessels.

A rocky ledge covered 9 feet is 0.2 mile offshore at the mouth of **Silver Creek,** 4.2 miles NE of Two Harbors Light. **Encampment Island,** 3.2 miles NE of Silver Creek, is connected to the shore by a shoal with depths less than 12 feet. About 4 miles NE of Encampment Island, a group of rocks awash extends 0.4 mile from shore.

Local magnetic disturbance.–Differences from normal variation of 005°E have been observed near Encampment Island.

Gooseberry River flows into Lake Superior about 13.5 miles NE of Two Harbors. An extensive gravel beach extends S from its mouth. Good water extends up to the beach. **Gooseberry Reef,** reported covered 4 feet, is 0.5 mile from shore 1 mile S of the river.

Local magnetic disturbance.–Differences from normal variation of from 004°E to 008°E have been observed near Gooseberry River.

At the mouth of **Split Rock River,** a small indentation offers protection from W to N winds and limited protection from NE and SW winds. **Corundum Point** (47°11.5'N., 91°22.9'W.), 1.5 miles NE of Split Rock River, offers no protection. Abandoned Split Rock Light, 1 mile NE of Corundum Point, is a buff-colored octagonal tower with a white horizontal band. The tower is part of Split Rock Lighthouse State Park. The light is occasionally lighted for exhibition purposes.

Local magnetic disturbance.–Differences from normal variation of from 011°W to 011°E have been observed in the vicinity of Corundum Point.

Little Two Harbors is a small bay between Corundum Point and the abandoned Split Rock Light. A detached rocky reef, covered 22 feet, is 0.5 mile E of Corundum Point. The reef drops off suddenly to deep water on its E side and is a danger to small craft due to the swell or wave thrown up by the steep E face.

Charts 14966, 14967.–Beaver Bay, about 50 miles NE of Duluth Ship Canal, is about 0.7 mile wide and indents the shore about 0.3 mile. The 16-foot depth contour is within 30 to 200 feet of shore. Large boulders are in all parts of the bay. The shore of the bay is bordered by bluffs that rise 75 to 200 feet above the lake. The bay affords some shelter from S, W, and N storms, but is open and unprotected to NE, E, and SE. The most dangerous storms at this end of the lake are from NE, the seas having a fetch of more than 250 miles. Two piers are on the N side of the bay. The E pier has a depth of 5 feet at the outer end, and the W pier 9 feet at the outer end.

Silver Bay Harbor is a private harbor developed by the Reserve Mining Company about 52 miles NE of Duluth Ship Canal. The stacks on the powerhouse just N of the harbor are prominent.

The harbor is about 1 mile long and 0.25 mile wide with depths of at least 30 feet over most of its area. The harbor is protected from the E and NE by **Beaver Island** and a breakwater that extends NW to shore from the N end of the island, and from the SW by **Pellet Island** and a breakwater that extends W from it to the shore. Beaver Island and Pellet Island are each marked on the NE side by a private light. In 1972, the controlling depth was 28 feet alongside the loading dock on the NW side of the harbor. A private light is off the SW end of the dock, and a radiobeacon is about 900 feet NE of the light. Shoaling to depths of less than 30 feet exists along the shore SW of the dock. A private lighted buoy is S of Beaver Island, a private buoy marks the outer edge of a shoal extending W from Beaver Island, and private lighted buoys mark the limit of deep water at the S end of the harbor.

Wharf.–Silver Bay has one deep-draft wharf on the NW side of the harbor. (For a complete description of the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for this facility are reported depths. (For information on the latest depths, contact the operator.)

Reserve Mining Co. Dock: 2,400-foot face; 30 to 32 feet alongside; deck height, 8½ feet; two traveling shiploaders, 3,800 tons per hour; traveling gantry crane with bucket, unloading rate for coal 1,000 tons per hour; open storage for over 5¼ million tons of iron ore pellets and over 1 million tons of coal; tank storage for 69,000 barrels of Bunker C; shipment of iron ore pellets; receipt of coal and occasionally steel; bunkering vessels; owned and operated by Reserve Mining Co.

Chart 14967.–From Silver Bay Harbor the shore extends NE for about 23 miles to Taconite Harbor. The shore is bold and rocky, with cliffs and steep slopes. Numerous small points and inlets afford limited shelter. There are no outlying obstructions, and the shore can be approached within 0.5 mile. **Baptism River,** 5 miles NE of Silver Bay Harbor, is the largest stream flowing into this stretch, and the area around its mouth is a State park. A lighted radio mast about 4 miles NE of Silver Bay Harbor near the summit of **Palisade Head** is prominent.

Local magnetic disturbance.–Differences from normal variation of from 004°W to 006°W have been observed in the vicinity of Baptism River and Palisade Head.

Taconite Harbor is a private harbor maintained by the Erie Mining Company about 75 miles NE of Duluth at the mouth of **Two Island River.** The harbor is a basin, about 0.8 mile long and 0.3 mile wide, enclosed by **Gull Island, Bear Island,** and a series of breakwaters. Three lighted stacks at the powerhouse at the N end of the harbor are prominent.

Gull Island, Bear Island, the breakwater between them, and the breakwater that extends NE from Bear Island protect the harbor from the SE. A breakwater that extends SE from shore at the N end of the harbor protects the harbor from the NE. The harbor is entered N from Lake Superior on the W side of Gull Island and is exited between the breakwaters at the NE end of the harbor.

The entrance to the harbor is marked by lighted buoys, lights, and a 028° lighted range. A radiobeacon is at the light on the W side of the entrance. The harbor exit is marked by lights on the outer ends of the breakwaters. Shoals at the N end of the harbor and off the end of the breakwater on the S side of the harbor exit are marked by lighted and unlighted buoys. All the aids in the harbor are private except the radiobeacon.

In 1972, the controlling depths were 27 feet in the entrance channel, 27 feet along the face of the dock on the NW side of the harbor, and 29 feet in the exit channel. Depths inside the harbor range from 27 feet to over 50 feet.

Caution.–In 1975, an anchor was lost in the entrance channel, about 600 feet N of the light on the E side of the entrance.

Wharf.–Taconite Harbor has one deep-draft facility on the NW side of the harbor. (For a complete description of the port facilities, refer to Port Series No. 49, published and sold by the U.S. Army Corps of Engineers. See appendix for address.) The alongside depths given for the facility described are reported depths. (For information on the latest depths, contact the operator.)

Erie Mining Co. Dock: 1,710-foot face; 30 feet alongside; deck height, 10½ feet; 25 vessel-loading conveyors, 1,500 tons per hour each; gantry crane with 14-ton bucket; open storage for 100,000 tons of iron ore pellets and 500,000 tons of coal; tank storage for 40,000 barrels of diesel oil and 120,000 tons of Bunker C; shipment of iron ore pellets; receipt of coal, Bunker C, and diesel oil; bunkering of vessels; owned by Bethlehem Steel Corp., Youngstown Sheet and Tube Co., The Steel Co. of Canada, and Interlake, Inc.; operated by Erie Mining Co.

From Taconite Harbor, the shore extends NE for 31 miles to Grand Marais. Steep slopes and cliffs in this reach rise to elevations over 900 feet above the lake within 1 to 2 miles of shore. **Carlton Peak,** 4.5 miles NNE of Taconite Harbor, and **Leveaux Mountain,** 8 miles NE of the harbor, are two of the tallest peaks. **Rock Island,** a low rocky projection in the E approach to **Good Harbor Bay,** 3.6 miles SW of Grand Marais, is the only off-lying obstruction in this reach. Otherwise, the shore can be approached within 0.5 mile.

The settlements of **Schroeder, Tofte,** and **Lutsen** are close to shore in this reach, 1.3, 5, and 14.5 miles NE of Taconite Harbor, respectively. Landings at these places may be made by light-draft vessels in calm weather, but no shelter or dockage is provided. Tofte has a launching ramp. None of the streams that empty into this reach are navigable. **Temperance River** and **Cascade River,** 2.5 and 22 miles NE of Taconite Harbor, respectively, are the largest.

Grand Marais Harbor is a small-craft harbor 31 miles NE of Taconite Harbor and 106 miles NE of Duluth. It is the only harbor with facilities and adequate protection for small craft in the 125 mile stretch between Two Harbors and the International boundary at Pigeon River. The harbor is a semicircular bay with a narrow opening to S between two points of land. The harbor is a commercial fishing base. **Grand Marais, Minn.,** is a town on the N side of the harbor.

Grand Marais Light (47°44.7'N., 90°20.3'W.), 38 feet above the water, is shown from a white square pyramidal skeleton tower, upper part enclosed, on the E side of the harbor entrance. A radiobeacon is at the light.

Channels.–The dredged harbor basin is entered N from Lake Superior between breakwaters that extend from the E and W sides of the entrance. An inner breakwater protects a dredged small-craft basin in the N part of the harbor. The outer ends of the entrance breakwaters and the inner breakwater are marked by lights. In 1970, the controlling depths were 16 to 20 feet in the main harbor basin except for shoaling to 14 feet in the NW part, and thence in 1980, 7 feet in the small-craft basin.

Anchorage.–The E part of the harbor is fairly well protected from all storms, and fair anchorage is available in the E part of the dredged area for a few vessels. The W part of the harbor is shoal, exposed to SE storms, and considerably exposed to NE swells.

Caution.–Vessels entering the harbor during NE storms should keep well over to the E breakwater to avoid the shoals to W.

Local magnetic disturbance.–Large magnetic disturbances have been reported in the vicinity of Grand Marais Harbor.

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

North Superior Coast Guard Station is on the SE side of the harbor basin.

Small-craft facilities.–Two wharves in the SE corner of the harbor basin, one partly in ruins, are not safe for mooring. A marina in the basin at the N end of the harbor provides gasoline, diesel fuel, water, electricity, sewage pump-out, and limited supplies and repairs. Small craft can find safe moorings in the basin. Mooring to the breakwaters is prohibited.

At the SE end of the point that encloses the E side of Grand Marais Harbor, a reef with a depth of 8 feet at the outer end extends 1,000 feet E from shore.

From Grand Marais Harbor NE for 34 miles to Grand Portage Bay, the shore is rocky and bold, with deep water close-to and a few outlying rocks. **Five Mile Rock,** awash, is 0.8 mile offshore 5 miles NE of Grand Marais Light. **Marr Island,** low and rocky, is on the outer end of a reef that extends 0.4 mile from a small point 12.5 miles NE of Grand Marais. A detached rock, covered 5 feet, is 0.4 mile offshore 0.7 mile SW of the S entrance point to Grand Portage Bay. **Chicago Bay** and **Big Bay,** 18 and 21 miles NE of Grand Marais, respectively, are the largest indentations in this stretch and afford limited protection. **Hovland,** a settlement on Chicago Bay, has a small privately owned dock.

Caution.–This stretch of shore should be given a berth of 1 mile because of frequent fogs and local magnetic disturbances.

Charts 14967, 14968.–Grand Portage Bay, about 5 miles SW of the International boundary, is about 2 miles wide and extends 1.3 miles into the shoreline. **Hat Point** (47°57.2'N., 89°38.3'W.), marked by a light, encloses the NE side of the bay and separates it from Wauswaugoning Bay. A radiobeacon is at the light. **Grand Portage Island,** in the middle of the entrance to the bay, affords some protection from offshore winds. Inside Grand Portage Island, the bay has depths of 6 to 12 feet. Boats drawing 8 feet or more should not approach nearer than 0.25 mile to shore. A 6-foot shoal midway between Grand Portage Island and Hat Point renders the bay entrance NE of the island hazardous.

Small-craft facilities.–Marinas on the N and W sides of the bay provide berths, gasoline, diesel fuel, water, electricity, sewage pump-out, and launching ramps. A small store is near the ferry dock on the NW side of the bay. Small passenger ferries run from this dock to several harbors on Isle Royale.

Ferries.–A ferry service operates between Grand Portage and Isle Royale National Park in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich. 49931.

Wauswaugoning Bay is just NE of Grand Portage Bay, separated from it by Hat Point. The shore of the bay along Hat Point is a continuous rocky cliff rising to about 100 feet above the lake. **Mount**

Josephine, at the inner end of Hat Point, rises 700 feet above the lake. The NW side of the bay is bordered by a 500-foot bluff with a boulder beach broken by cliffs. The NE side of the bay is low and heavily wooded.

A rocky reef, covered 5 feet, is about 0.6 mile offshore on the NW side of Wauswaugoning Bay. **Francis Island,** small and rocky, is on a rocky ledge that extends 0.4 mile W from the E point of the bay. Aside from these hazards and the shallows at the NE end of the bay, there are good depths and the shores are fairly deep-to. The bay has good holding ground for anchorage, but is exposed to SE to SW winds.

Wauswaugoning Bay is partially protected by a group of small islands that extend 2 miles SE from the E point of the bay. **Lucille Island,** the outermost, **Susie Island,** and **Magnet Island** are the largest in the group. A dangerous detached rock is 0.3 mile SE of the SW point of Lucille Island. Caution is advised when navigating around and between these islands.

From Wauswaugoning Bay, the shore trends ENE for 5.5 miles to Pigeon Point (48°00.2'N., 89°29.8'W.). **Clark Bay,** at the inner end of Pigeon Point, is a small inlet open to E and protected on the S side by a point and two small islands. **Pigeon Point** is a rocky peninsula that extends 3.5 miles ENE and encloses the S side of **Pigeon Bay.** The bay, about 3.5 miles long and 1 mile wide, is bordered by high hills and bluffs which protect it from all directions but E. **Pigeon River** flows into the W end of the bay at the base of Pigeon Point.

Local magnetic disturbance.–Large magnetic disturbances have been reported near Pigeon Point.

The **International boundary** between the United States and Canada extends through Pigeon Bay and then follows the Pigeon River.

Time.–Lakeshore areas of the Canadian Province of Ontario observe eastern standard time or eastern daylight saving time. Areas S of the Pigeon River on the W shore of Lake Superior observe central standard time or central daylight saving time.

Boundary Island is a dangerous reef with several small islets near the center of Pigeon Bay. Close NW of Boundary Island, a narrow point extends 1 mile E from shore to divide the inner part of the bay into two arms. A reef with small islets extends off the end of the point. **Acadia Rock,** covered 4 feet, is 1 mile WSW of Boundary Island. **Laura Grace Rock,** covered 6 feet, is 0.3 mile W of Acadia Rock. Other than these dangers, the bay has deep water. Caution is advised when anchoring, because the rocks limit the available room and the holding ground is not good.

Charts 14968, 14976.–Isle Royale is 44 miles long NE and SW and has a maximum width near its SW end of 8.5 miles. **Mount Desor,** 794 feet above the lake and the highest point on the island, is 12.5 miles from the SW end. The shores of the island have numerous indentations and many detached islets and reefs, almost all with a NE and SW trend. Good lees can be found in many bays and channels.

Local magnetic disturbance.–Magnetic disturbances have been observed around Isle Royale.

Isle Royale and its surrounding islands form **Isle Royale National Park,** established in 1940 under the jurisdiction of the National Park Service, U.S. Department of the Interior. The park is retained as much as possible in its natural state. There are no roads, only trails for hikers.

Recreational docks operated by concessions for the National Park Service at Rock Harbor, and at Windigo Ranger Station at Washington Harbor, offer groceries, gasoline, and water for the convenience of visitors. Small docks, generally in good repair and in sheltered areas, are maintained at the many campsites around the island. Most of them have from 5 to 10 feet at their outer ends. Lights are operated on the docks at Windigo, Rock Harbor, and the Park Service Headquarters dock on Mott Island on the SW side of Rock Harbor. Complete details regarding the island and its use are available from the Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich. 49931.

Caution.–Designated aircraft landing areas are in Washington Harbor, Rock Harbor, and Tobin Harbor. (See **36 CFR 2.2 and 7.38,** chapter 2, for limits and regulations.)

Rock of Ages Light (47°52.0'N., 89°18.8'W.), 117 feet above the water, is shown from a white conical tower on a small islet 3.8 miles W of **Cumberland Point,** the southwesternmost point of Isle Royale. A fog signal and a radiobeacon are at the light.

A reef extends 0.4 mile SW and 0.1 mile NE from Rock of Ages. **Fisherman Reef,** 5.5 miles SW of Rock of Ages Light, has a least depth of 23 feet. Five shoal spots with depths of 7 to 16 feet are from 0.7 to 1.4 miles NE of the light. Several shoals with depths of 3 to 14 feet are within 1.2 miles S and SW of the light. The southernmost spot, covered 12 feet, is marked on the W side by a buoy. An 11-foot spot is 0.3 mile SE of the light.

Grace Harbor and **Washington Harbor,** at the SW end of Isle Royale, have good holding ground and provide protection from all winds except SW winds in Grace Harbor. Grace Harbor is enclosed on the S by **Cumberland Point** and on the N by a line of islands, of which **Washington Island** is the largest and **Grace Island** the easternmost. The islands separate Grace Harbor from the outer part of Washington Harbor. A rock, covered 2 feet and marked by a buoy, is on the outer edge of the shoals off Cumberland Point. Several shoals and small islands extend W from Washington Island. The outermost are a 2-foot spot 0.7 mile SW and an 18-foot spot 1.1 miles WSW. A narrow 20-foot channel marked by buoys leads between the E end of Washington Island and **Booth Island** N to Washington Harbor. The N side of the outer part of Washington Harbor is enclosed by **Johns Island** and **Thompson Island.** Shoal spots of 3 to 11 feet extend 0.5 mile SW from Johns Island, the westernmost, and a detached 13-foot shoal is 0.2 mile SE of the island. The entrance to Washington Harbor is 0.3 mile wide between Washington Island and the shoals SW of Johns Island. A narrow deep channel leads between Thompson Island and Isle Royale into the harbor. A private daybeacon marks the NE side of Thompson Island, and a private buoy marks a sunken wreck on the E side of the channel. A small islet and a 3-foot shoal are 0.2 mile N of Grace Island.

The inner part of Washington Harbor extends 3.3 miles into the shoreline of Isle Royale. **Beaver Island** is near the E end of the harbor and may be passed by small craft on either side. A rock awash is off the N shore of the harbor, 0.25 mile W of the SW end of Beaver Island. A wharf is at Windigo Ranger Station at the head of the harbor. Gasoline, diesel fuel, water, and sewage pump-out facilities are available. A small store is nearby.

Ferries.–A ferry service operates between Grand Portage and Windigo in Washington Harbor in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich. 49931.

From Washington Harbor, the shore of Isle Royale trends N for 1.2 miles to the NW corner of the island. A small island and a detached 7-foot shoal are 0.25 mile offshore about 0.6 mile N of Thompson Island.

McGinty Cove is a small indentation 1 mile NE of the NW corner of the island. From the cove NE for about 19 miles to Todd Harbor, the shore is bold, clear, and deep-to except for several small detached shoals. **Finlander Reef,** comprising 6-foot and 7-foot spots, is 0.25 mile from shore 6.3 miles NE of McGinty Cove. A 3-foot spot is close to shore 5.3 miles NE of Finlander Reef. **Gull Rocks,** marked by a private marker, are 0.5 mile from shore about 6 miles SW of Todd Harbor. A 3-foot and a 14-foot spot are close inshore adjacent to Gull Rocks.

Todd Harbor, about midlength of the N shore of the island, is about 5 miles long and indents the shore 0.75 mile. The harbor affords good protection from all but N winds. Care must be taken to avoid the many detached shoals and rocks in the harbor.

From Todd Harbor to McCargoe Cove, the shore should be given a berth of 1 mile. **Hawk Island** parallels the shore in this stretch. An islet and rocks awash are 0.8 mile SW of Hawk Island. A 3-foot shoal is 0.15 mile N and rocks awash are 0.75 mile NNE of the island.

McCargoe Cove, about 4.5 miles NE of Todd Harbor, is a narrow inlet that extends over 2 miles SSW into the shore of Isle Royale. A rocky ledge extends NE from the W side of the entrance and is marked at the outer end by a private buoy. The cove is entered between this and another private buoy close NNW. Coming around the ledge, vessels must turn through 090° on a radius of about 200 feet to keep in depths of 18 feet or more. The channel into the cove has a least depth of 15 feet, but inside depths are 30 to 40 feet. Small docks are on **Birch Island** on the E side of the cove entrance and near the head of the cove.

The NE end of Isle Royale, quite rugged and broken, consists of many peninsulas, islands, and ridges separated by narrow channels and bays of deep water, all with a NE trend. The area is obstructed by numerous shoals and reefs which render navigation dangerous. **Amygdaloid Island, Canoe Rocks,** and the line of islands and reefs between them form the N limit of this area from McCargoe Cove NE for 10 miles. Amygdaloid Ranger Station is on the SW end of Amygdaloid Island. **Amygdaloid Channel** parallels the S side of Amygdaloid Island and is separated from **Robinson Bay** by a narrow peninsula, **Belle Isle, Green Island,** and a series of small islands and reefs. A small-craft dock is on the S side near the E end of Belle Isle. **Hill Point,** the SE entrance point to Robinson Bay, separates it from **Five Finger Bay.** A peninsula that terminates in **Locke Point** separates the S side of Five Finger Bay from Duncan Bay. A reef that extends 0.3 mile NE from Locke Point is marked at the outer end by a buoy.

Duncan Bay, entered at the NE end of Isle Royale between Locke Point and Blake Point, extends about 4.5 miles SW. A point about 1 mile above the entrance divides the bay. The main body of the bay leads S of the point, through a narrow passage to a large bay. A rock awash is in midchannel of the narrowest part of the passage S of the point. The channel, S of the rock, has depths less than 12 feet. A 17-foot shoal is near midchannel S of the point that divides the bay. A small dock is on the S side of the narrow passage.

Blake Point, the northeasternmost point of Isle Royale, forms the S entrance point to Duncan Bay. **Blake Point Light** (48°11.5'N., 88°25.4'W.), 40 feet above the water, is shown from a skeleton tower with a small house and a red and white diamond-shaped daymark on the point. An 11-foot shoal, marked on the NE side by a buoy, is 0.3 mile E of the light. **Five Foot Reef,** 0.9 mile E of the light, has a least depth of 4 feet and is marked on the S side by a buoy. A 13-foot shoal is 1.2 miles E of the light.

Passage Island Light (48°13.4'N., 88°22.0'W.), 78 feet above the water, is shown from a gray octagonal tower on a dwelling on the SW end of **Passage Island,** 3.5 miles NE of Blake Point. A fog signal, a radiobeacon, and a radar transponder beacon (Racon) are at the light. (See Racons, chapter 1, for additional information.)

Gull Islands are 3.5 miles NE of Passage Island. A shoal covered 2 feet is 0.5 mile S of the islands, and a group of detached rocky spots, covered 7 to 12 feet, is 0.7 to 2.5 miles NW of the islands. **Bateau Rock,** bare, is 10.8 miles ENE of Passage Island. A dangerous submerged rock is 0.3 mile E and an 8-foot shoal is 0.5 mile W of Bateau Rock.

Tobin Harbor parallels Duncan Bay on the S side of Blake Point. **Scoville Point** is on the NE end of the peninsula that encloses the S side of the harbor. The harbor has good holding ground with protection from all winds, but is available only to small craft because of the narrow entrance. A dock is on the N side of the harbor about 1.1 miles SW of Scoville Point.

Rock Harbor, S of Tobin Harbor, is about 13 miles long NE and SW. The outer 9.5 miles of the harbor is enclosed on the S side by a chain of islands and shoals. The harbor has good holding ground with protection from all winds. The fully enclosed W 3.5 miles of the harbor is obstructed near its midlength by shoals through which an 11-foot channel is marked by buoys.

Rock Harbor can be entered at the NE end between **North Government Island** and **South Government Island.** Another wide, deep passage enters the harbor from S opposite Scoville Point. **Middle Islands Passage** enters the harbor from S at the inner end of the island chain. The channel has an available depth of 26 feet and is marked by a lighted bell buoy and two unlighted buoys. **Caribou Island,** on the E side of the passage, is marked on the SW end by a private light that marks the E side of the passage. Trees on the island obscure the light from small craft approaching from NE and SE.

Rock Harbor Lodge is in a bight on the N side of Rock Harbor, 2 miles SW of Scoville Point. A 12-foot spot off the E entrance point to the bight is marked by a buoy. A wharf marked by a private light on the N side of the bight provides gasoline, diesel fuel, water, sewage pump-out, and electricity. Transient berths are available at several piers in the bight.

The National Park Headquarters is in a bight on the NW side of **Mott Island,** 1.6 miles NE of Middle Islands Passage. The wharf at the headquarters has depths of 20 feet at the outer end, decreasing to 13 feet at its midlength, and with the inner end available for small boats. Gasoline, sewage pump-out facilities, and a hoist that can handle 60-foot craft for emergency repairs are available.

Ferries.–A ferry service operates between Copper Harbor on the Keweenaw Peninsula and Rock Harbor in the summer. The schedule is available from Superintendent, Isle Royale National Park, 87 N. Ripley Street, Houghton, Mich. 49931

From Middle Islands Passage, the shore of Isle Royale extends S for 2 miles and thence SW for 23 miles to the head of Siskiwit Bay. This bay parallels the shore in the SW 12 miles of this reach and is enclosed on the S by a chain of islands and reefs. From Middle Islands Passage to Chippewa Harbor, shoals extend no more than 0.2 mile from shore.

Conglomerate Bay, 0.8 mile S of Middle Islands Passage, has deep water and good protection from all but E winds.

Chippewa Harbor, 5.4 miles SW of Middle Islands Passage, extends 2 miles W and SW into the shoreline of Isle Royale. The harbor is divided into deepwater areas by two narrows. Depths are about 14 feet through the first narrows and about 10 feet through the second. A dock is on the N side of the harbor just inside the first narrows.

From Chippewa Harbor, the shore is free of outlying obstructions for about 6 miles to **Schooner Island** where shoals and submerged rocks extend 0.4 mile from shore.

Malone Bay, just W of Schooner Island, is an indentation 3.5 miles wide, open to S except for protection behind **Hat Island, Ross Island, Malone Island,** and **Wright Island.** Shoals around these and other small islands, as well as numerous detached shoals, render navigation of Malone Bay hazardous.

A channel with a depth of about 18 feet extends into Malone Bay between Malone Island and Wright Island. The channel is marked by buoys that mark dangerous shoals on either side of the channel. The bay has protection from all winds in depths of 36 to 48 feet, mud and clay bottom. Malone Bay Ranger Station is on the NE side of the bay.

Hopkins Harbor is a sheltered inlet in the W side of Wright Island. A wharf on the S side of the inlet has depths of 15 feet alongside. Caution is advised when entering the inlet, because submerged boulders extend from the N side of the entrance.

Siskiwit Bay, 12 miles long and 1.5 to 3 miles wide, is the largest indentation on the island. The bay has protection from all but NE to E winds. Good holding ground is 1.5 miles S of Wright Island. A dock on the S side near the head of the bay has a depth of 6 feet at the outer end. The bay is enclosed on the S side by a peninsula that terminates in **Point Houghton** (47°54.1'N., 88°54.0'W.) and by a double line of islets and reefs that extends 8 miles NE from the point, parallel to the S shore of Isle Royale. The only channel through the chain is 0.5 mile E of Point Houghton. The channel, marked by a lighted bell buoy and other buoys, has a depth of about 17 feet. **Harlem Reef,** with a least depth of 2 feet, is on the S side of the islet chain, 2.8 miles E of Point Houghton. A buoy marks the S side of the reef.

Isle Royale Light (47°56.9'N., 88°45.7'W.), 72 feet above the water, is shown from a white octagonal tower with an attached dwelling on **Menagerie Island,** near the outer end of the islet chain on the S side of Siskiwit Bay. **Glenlyon Shoal,** with a least depth of 4 feet, is 0.7 mile NE of the light, and an 18-foot spot is 1.3 miles NE of the light.

From Point Houghton, the shore of Isle Royale extends about 13 miles SW to **The Head,** the southernmost point of the island. Numerous ledges and rocky spots obstruct this stretch, and it should be given a berth of at least 1 mile. **Fishermans Home,** a small cove 0.9 mile SW of Point Houghton, has a commercial fishing operation with two docks. A narrow channel with a depth of 5 feet leads along the N side of the entrance into the cove. The entrance is deceptive and must be navigated with caution.

From The Head, the shore extends NW for 4 miles to Cumberland Point on the S side of Grace Harbor.

Charts 14968, *2311.–Pine Bay, a shallow indentation 2 miles N of Pigeon Point, has good shelter and holding ground for small craft. The entrance to the bay is narrow and difficult. **Pine Point** (48°02.4'N., 89°27.1'W.), 2 miles E of Pine Bay, encloses the S side of **Big Trout Bay.** The bay has excellent protection from all but NE and E winds with anchorage in depths generally over 60 feet. A 9-foot shoal is in the bay entrance, 1 mile NE of Pine Point.

Cloud Islands, three small islets, are 2 miles NE of Pine Point. A shallow spit extends 900 feet SW from the SW island, and a rock covered 7 feet is 450 feet NE of the N island. **Pinnacle Rock,** 26 feet high, is 0.4 mile NE of Cloud Islands.

McKellar Point, 3 miles NE of Pine Point, encloses the S side of Little Trout Bay and separates it from Big Trout Bay. **Little Trout Bay** has excellent anchorage with protection from all winds in depths less than 60 feet, mud and clay bottom. **Cloud Bay,** on the N side of Little Trout Bay, shoals toward shore and has limited anchorage at the center in depths of 15 to 28 feet, mud bottom. A wharf with depths of 1 to 3 feet alongside is on the W side of the bay at the mouth of **Cloud River.**

Caldwell Point, 3.2 miles NE of McKellar Point, encloses the E side of **Crystal Bay. Sucker Island** is on the W side of the bay entrance, and **Caldwell Island** is near the middle of the entrance. **Caldwell Shoal,** covered 4 feet and marked on the SE side by a buoy, is 0.2 mile S of Caldwell Point.

Victoria Island, S of Caldwell Point and 2.2 miles E of McKellar Point, is at the SW end of a string of islands, shoals, and rocks that extend about 20 miles NE. The islands give excellent protection to a channel from Victoria Island to Thunder Bay. Victoria Island is marked on the SW point by a light. A shallow reef extends about 500 feet SW from the point and is marked by a buoy. **Tiger Island** is 0.4 mile S of the light. **Tiger Rock,** 15 feet high, is close W of the island.

Iroquois Rock, covered 4 feet, is marked by a buoy 0.6 mile SW of Victoria Island Light. A deep channel about 0.4 mile wide leads between the rock and the reef that extends SW from Victoria Island. **Victoria Cove** is a large deep bight in the S side of Victoria Island. **Rolland Rock,** bare, is on the S side of the entrance to the cove. Rocks covered less than 6 feet are 0.2 mile NE and 0.1 mile S of Rolland Rock. A rock covered 2 feet is near the middle of the cove entrance and must be avoided by holding closer to the SW side of the entrance.

Several small islands and rocks are between Victoria Island and Spar Island, 1.6 miles NE. A narrow passage with a depth of about 19 feet leads between **Devil Island** and **Jarvis Island. Spar Channel** is about 900 feet wide between **Bradshaw Island** on the E and **Jarvis Rock,** marked by a light, on the W. A shoal extends about 400 feet SW from Bradshaw Island into the channel.

Spar Island extends 1.6 to 4 miles NE from Victoria Island. The shores of the island are deep-to except for several rocks close to the NW shore. **Spar Reef,** awash, is 0.1 mile from shore, 0.7 mile NNE of the SW end of the island.

Thompson Island, up to 0.3 mile wide, extends from 2.2 to 6 miles NE of Spar Island. Numerous small islands, rocks, and reefs are between the islands. The passage between these dangers should be navigated with caution. The shores of Thompson Island are deep-to.

South McKellar Island is about 0.8 mile NE of Thompson Island with several islands and reefs between. There are no passages between these islands.

Pie Island, 7 miles long and 4 miles wide, is on the W side of the entrance to Thunder Bay. **Le Pate,** 861 feet high, is on the W end of the island. A light is on the W side of the island, W of Le Pate. The N and NE shores of the island should be given a berth of 0.5 mile. The other shores have deep water within 0.2 mile. **Dawson Bay,** on the S side of the island, has anchorage near its head in depths of about 36 feet, sand bottom. Anchorage with protection from S winds is 0.7 mile N of Pie Island in depths of 30 to 36 feet, clay bottom. **Steamboat Island,** 17 feet high, is a small islet 1 mile WSW of Keefer Point, the SW point of the island. A rock covered 3 feet is close SW of Steamboat Island. **Deadman Island,** 12 feet high, is 0.3 mile SW of Steamboat Island. Shoals extend 0.2 mile from all but the N shore of the island.

Local magnetic disturbance.–Large magnetic disturbances have been reported near Pie Island.

Angus Islands is a small string of islets and shoals 1.3 miles SE of **Turtle Head,** the E point of Pie Island. The largest of the group, 46 feet high, is marked by a light. **Angus Island Light** (48°14.2'N., 89°00.4'W.), 81 feet above the water, is shown from a skeleton tower on the NE end of the island; a fog signal and a radiobeacon are at the light. A rock 11 feet high is 0.1 mile NE of Angus Island Light, and a rock 4 feet high is 0.1 mile farther E.

Hamilton Island, 31 feet high, is 1.1 miles SW of Angus Island Light. A small shoal extends N from the island. **Cone Island,** 0.4 mile S of Hamilton Island, has a shoal on its S side. **Craig Rock,** awash, is 1.1 miles W of Hamilton Island. A rock, covered 4 feet, is 1.8 miles WSW of Cone Island. **Baker Rock,** covered 3 feet, is 2.5 miles WSW, and **Lord Stanley Rock,** covered 4 feet, is 3.3 miles WSW of Cone Island. A 7-foot spot is close SW of Lord Stanley Rock.

Jarvis Point (48°06.7'N., 89°19.6'W.) is 1.5 miles NE of Caldwell Point; the shore between is deep-to. **Jarvis Bay** opens to E on the N side of Jarvis Point. **Prince Bay,** on the N side of Jarvis Bay, has shallow anchorage for small boats. Limited anchorage for large craft is in the SW part of Jarvis Bay.

Mink Point, 2.2 miles NE of Jarvis Point, is marked by a light. **Mink Island** is narrow and extends from 0.4 to 2 miles NE of the point. The shores of the island are deep-to. A rock awash is 0.3 mile NE of the island. **Sister Islands** are two islets 0.8 and 1.2 miles NE of Mink Island. Shoals connect the two islands, and a rock awash is close NE of the NE island. **Sly Rock,** awash, is 0.3 mile NE of the NE island.

Mink Bay is enclosed between Mink Point on the S and **Sturgeon Point** (48°10.5'N., 89°17.1'W.) on the N. Good anchorage for small craft is in the SW part of the bay between **Muskrat Island** and **Nisbet Island. Sturgeon Bay,** NW of Sturgeon Point, has a narrow entrance with depths of about 6 feet. Good anchorage for small craft with protection from all winds is available in the bay, mud bottom. Large vessels can anchor on the N side of Sturgeon Point in depths of 30 to 36 feet. **Zealand Spit,** with depths less than 6 feet, extends 0.4 mile S from shore on the N side of Sturgeon Bay entrance.

Flatland Harbour, 2.5 miles N of Sturgeon Point, is enclosed on the S by **Wyllie Point,** on the SE by **Dog Island,** and on the E by **Flatland Island.** The entrance to the harbor between Wyllie Point and Dog Island is shallow, but suitable for small craft. The entrance E of Dog Island is difficult, being bordered on both sides by shoals and by **Rowan Reef,** awash, 0.25 mile N of Dog Island. On the N side of the harbor, a shoal bank extends W from the N end of Flatland Island. **Birch Island** is near the outer end of the bank. The main entrance to the harbor is between Birch Island and the mainland opposite W. Anchorage with good shelter is S of Birch Island in depths of about 24 feet, mud bottom. Two wharves on the NW side of the harbor are in ruins and mostly submerged.

Campbell Island is on the outer end of a shoal that extends 0.7 mile E from the SE point of Flatland Island. **Alexander Reef,** awash, is 0.4 mile SW of Campbell Island and is marked on the S side by a buoy. A deep passage about 0.9 mile wide extends between Alexander Reef and Campbell Island on the W and Deadman Island on the E. **Flatland Reef,** with a least depth of 4 feet, extends 1.2 miles N from Flatland Island.

Charts 14968, *2301, *2311.–Thunder Bay is a fine body of water about 34 miles long NE and SW with a width of 15 miles at the center, narrowing at each end. The bay is entered between Flatland Island on the W and Thunder Cape, 14 miles ENE. Pie Island divides the entrance into two channels.

The E entrance between Pie Island and Thunder Cape is a deep channel 5.5 miles wide. **Thunder Cape** is a prominent headland at the SW end of **Sibley Peninsula,** which encloses the E side of Thunder Bay. The S end of the cape, marked by a light, is low, then gradually rises for 1 mile, and then rises steeply to **The Sleeping Giant,** a 1,200-foot hill. The cape has deep water within 0.2 mile.

Local magnetic disturbance.–Large magnetic disturbances have been reported near Thunder Cape.

Hare Island, 21 feet high, is 1.8 miles NW of Thunder Cape on **Hare Island Reef.** A 16-foot spot 1.5 miles SSW of Hare Island is marked on the SW side by a lighted buoy.

From Flatland Island N for about 6 miles to **Grand Point** (48°18.6'N., 89°12.0'W.), the W shore of Thunder Bay is clean within about 0.2 mile. **Squaw Bay,** 1.2 miles SW of Grand Point, is enclosed on the E side by **McNab Point.** A Government wharf on the E side of the bay has a depth of 9 feet alongside. **Grand Reef,** covered less than 6 feet and marked on the E side by a buoy, is 0.4 mile E of Grand Point. From Grand Point N to the mouth of Kaministiquia River, a mud flat extends as much as 1.3 miles from shore.

Charts 14968, *2301, *2314.–Welcome Islands are four islands, two large and two small, centered about 4.5 miles NE of Grand Point in the approach to Thunder Bay. **Welcome Island Light** (48°22.2'N., 89°07.2'W.), 138 feet above the water, is shown from a square skeleton tower on the N side of the northeasternmost island; a fog signal is at the light. The two small islands are on **Welcome Shoal,** which extends 0.8 mile S from the W large island. A lighted buoy is off the S end of Welcome Shoal. Shoals of 8 and 10 feet are 0.5 mile S and 1.1 miles SSW of Welcome Island Light, respectively. **Schwitzer Shoal,** with a least depth of 18 feet, is 3.5 miles NE of Welcome Island Light.

Local magnetic disturbance.–Large magnetic disturbances have been reported near Welcome Islands.

Lakehead Harbour, serving the city of **Thunder Bay, Ont.,** is on the W side of Thunder Bay. The harbor, administered by the Lakehead Harbour Commission, is divided into two sections. The S section has facilities in Kaministiquia River, McKellar River, and Mission River. The N section fronts on Thunder Bay and is protected by a series of breakwaters. The harbor is the great shipping center for northwest Canada. Grain elevators in the harbor have a total capacity of about 90 million bushels. Iron ore, coal, petroleum products, and steel and paper products are also handled.

The Lakehead Harbour Commission operates a marine traffic control and information center on VHF-FM channel 16 (156.80 MHz), working channels 12 (156.60 MHz) and 14 (156.70 MHz); call sign, VDX 30. Vessels entering the harbor should contact the station upon arrival at the Welcome Islands. Vessels leaving their berths shall contact the station prior to undocking. The station is manned 24 hours per day throughout the shipping season.

Canadian Coast Guard radio station, call sign, VBA, provides services including customs, fire, ambulance, and police.

Prominent features.–Prominent are the lighted radio towers on **Mount McKay** on the S side of Kaministiquia River, the 650-foot chimney on the N side of Mission River, the grain elevators in the N section of the harbor, and the 175-foot water tower on **Bare Point** at the N end of the harbor.

Thunder Bay Main Light (48°26.0'N., 89°11.8'W.), 49 feet above the water, is shown from a white square tower on the end of the breakwater on the N side of the main or middle entrance to the N section of Lakehead Harbour. A fog signal and a radiobeacon are at the light.

Channels.–Kaministiquia River is the main river forming the S section of Lakehead Harbour. **McKellar River** and **Mission River** branch from Kaministiquia River 1.9 and 2.6 miles above its mouth, respectively, and flow into Thunder Bay 1.1 and 2.7 miles S of it. The shoals at the mouths of the rivers are formed of sandy silt with a gentle slope. Small boats may ground as much as 0.5 mile from shore.

A dredged channel leads across the shoals at the mouth of Kaministiquia River and thence upstream for about 5.4 miles to Westfort Turning Basin at the head of the project. A 2,000-foot detached breakwater is 600 feet S of and nearly parallel to the entrance channel. The S end of the breakwater system that encloses the N section of the harbor extends S to within 200 feet of the outer end of Kaministiquia River entrance channel. A light and a fog signal are on the S end of the breakwater. The entrance channel is marked by lighted and unlighted buoys, and the N side of the river mouth is marked by a light. The entrance channel is maintained to a depth of 27 feet and the river channel to a depth of 25 feet. The entrance and river channels are subject to silting; mariners should contact Lakehead Harbour Commission for information on the latest depths.

McKellar River is 1.5 miles long from its mouth to the junction with Kaministiquia River. The channel across the shoals at the mouth of the river is marked by buoys. The entrance channel and river are no longer maintained and are closed to commercial navigation. In 1980, a tunnel was under construction 0.2 mile above the mouth. The river has shoaled to 3 feet at the mouth. Pleasure craft are advised to use caution. Mariners should contact Lakehead Harbour Commission for information on the latest depths.

Mission River is about 2 miles long from its mouth to the junction with Kaministiquia River. A channel, dredged to 27 feet, leads across the shoals at the river mouth and thence through the river. The entrance channel, marked by lighted and unlighted buoys and a **289°05′** lighted range, is bordered on the S side by a breakwater that encloses a reclamation area. The ends of the breakwater are marked by lights; a fog signal is at the outer light. A turning basin, with a controlling depth of 25 feet in March 1981, is on the S side of the river just inside the mouth. The turning basin and river channel are marked by buoys. Mission River is subject to silting; mariners should contact Lakehead Harbour Commission for information on the latest depths.

The N section of Lakehead Harbour fronts Thunder Bay for about 5 miles N and NE from Kaministiquia River and is enclosed by a series of breakwaters. Three entrance channels lead between the breakwaters to dredged basins in the harbor. The S and middle entrances lead to the S basin, and the N entrance leads to the N basin. The breakwater entrances are each marked on either side by lights. Fog signals are at the lights on the S sides of the N and S entrances and on the N side of the middle entrance. The limits of the dredged basins are marked by buoys. The basins are dredged to a depth of 27 feet, but are subject to silting. In March 1981, the S basin had controlling depths of 26 feet in the N part and 25 feet in the S part.

Routes.–The courses recommended by the Dominion Marine and Lake Carriers Associations for approaching and leaving Lakehead Harbour are shown on Canadian chart 2301. Vessels bound for the N section of the harbor or the McKellar or *Kaministiquia Rivers pass* N of Welcome Islands; those bound for the Mission River entrance pass S of Welcome Islands.

The route that leads S from Thunder Bay and through the channel W of Pie Island is used by small vessels, primarily pleasure craft. It is a shorter and more sheltered passage for craft bound in the direction of Duluth but is only suitable for clear weather.

Caution.–A bubbler system extends channelward about 50 yards at Pool No. 1 at United Grain Growers Wharf; mariners are advised not to use anchors in the area.

Bridges.–Jacknife Bridge, a bascule highway and railroad bridge with a clearance of 11 feet, crosses Kaministiquia River about 2.2 miles above the mouth. The opening signal for the bridge is two long and two short blasts. The bridgetender should be contacted well in advance on VHF-FM channel 16 (156.80 MHz), working channels 12 (156.60 MHz) and 14 (156.70 MHz); call sign, Jacknife Bridge. An overhead cable with a clearance of 133 feet crosses the river 0.5 mile upstream. The highway and railroad swing bridge 4.5 miles above the river mouth has a clearance of 28 feet. The navigable channel is through the S draw of the bridge. The opening signal for the bridge is two long and two short blasts. An overhead cable with a clearance of 159 feet crosses the river just above the swing bridge.

A highway and railroad bascule bridge with a clearance of 12 feet crosses McKellar River near its head. Two hours' notice to the Lakehead Harbour Commission is required for opening the bridge.

An overhead cable with a clearance of 149 feet crosses Mission River 0.8 mile above the mouth.

Currents.–The current velocities in the Kaministiquia, McKellar, and Mission Rivers are variable, being controlled by a hydroelectric dam upstream in the Kaministiquia River. In the latter two rivers the direction of the current frequently reverses.

Towage.–Tugs are available from two companies in Thunder Bay for docking, undocking, and shifting vessels.

Thunder Bay is a **Canadian customs port of entry.**

Harbor regulations.–Vessels in Lakehead Harbour are subject to the Lakehead Harbour Commissioners Bylaws. Copies of these bylaws are available from the Lakehead Harbour Commission, P.O. Box 266, Thunder Bay, Ont. P7B 5E8. These bylaws specify a **speed limit** of 7 knots for all vessels navigating within 300 meters (1,000 feet) of the shore, 4 knots in the Kaministiquia, McKellar, and Mission Rivers for all vessels exceeding 100 gross tons, and 5 knots for all vessels when passing any vessel that is moored or anchored and displaying the signals indicating that it has explosives on board.

Wharves.–Thunder Bay has a large number of deep-draft facilities handling all types of cargo. The alongside depths given for the facilities described are reported depths. (For information on the latest depths, contact the Lakehead Harbour Commission or the operator.) Floating and mobile land cranes of 10 to 140 tons are available in the harbor.

Facilities in the N section of the harbor:

Abitibi Forest Products Ltd. East Wharf: E side of slip 1.2 miles NNE of Bare Point; 526-foot face; 18

feet alongside; 51,000 square feet covered storage; shipment of newsprint.

Abitibi Forest Products Ltd. West Wharf: W side of slip 1.2 miles NNE of Bare Point; 727-foot face; 16 feet alongside; receipt of coal.

United Grain Growers Wharf: N side of pier opposite N entrance; 1,050-foot face; 25 feet along outer 800 feet; 8¼-million-bushel grain elevator; loading capacity 70,000 bushels per hour; shipment of grain.

Saskatchewan Pool No. 4A and 4B Wharf: N side of pier 0.4 mile WNW of N entrance; 1,280-foot face; 26 feet alongside; 8½-million-bushel grain elevator; loading capacity 120,000 bushels per hour; shipment of grain.

Richardson Wharf: across pier S of Saskatchewan Pool No. 4A and 4B Wharf; 1,300-foot face; 16 feet alongside; 7¾-million-bushel grain elevator.

Saskatchewan Pool No. 6 Wharf: S side of pier 1 mile WSW of middle entrance; 800-foot face; 25 feet alongside; 7¼-million-bushel grain elevator; loading capacity 75,000 bushels per hour; shipment of grain.

Northern Wood Preservers Wharf: 0.4 mile S of Saskatchewan Pool No. 6 Wharf; 620-foot face; 15 feet alongside.

Canadian National Ore Dock: 0.1 mile S of Northern Wood Preservers Wharf; 1,520 feet long; 26 feet along N and S sides; loading spouts on both sides of pier; shipment of ore.

Manitoba Pool No. 3 Wharf: across slip S of Canadian National Ore Dock; 1,135-foot face; 21 feet alongside; shoaling reported 370 feet from W end in 1973; 7¾-million-bushel grain elevator; loading capacity 75,000 bushels per hour; shipment of grain.

Canada Malting Wharf: across pier S of Manitoba Pool No. 3 Wharf; 1,000-foot face; 18 feet alongside; 3-million-bushel grain elevator; loading capacity 50,000 bushels per hour; shipment of grain.

Saskatchewan Pool No. 7B Wharf: across slip S of Canada Malting Wharf; 1,220-foot face; 22 feet alongside; 14-million-bushel grain elevator; loading capacity 120,000 bushels per hour; shipment of grain.

Saskatchewan Pool No. 7A Wharf: across pier S of Saskatchewan Pool No. 7B Wharf: 2,160-foot face; 22 to 24 feet alongside; shipment of grain.

United Grain Growers Wharf: 0.15 mile S of Saskatchewan Pool No. 7A Wharf; 1,240-foot face; 18 feet alongside; 3¼-million-bushel grain elevator; loading capacity 70,000 bushels per hour; shipment of grain.

Manitoba Pool No. 1 Wharf: across slip S of United Grain Growers Wharf; 1,430-foot face; 27 feet alongside; 6-million-bushel grain elevator; loading capacity 80,000 bushels per hour; shipment of grain.

Superior Grain By-Products Wharf: across pier S of Manitoba Pool No. 1 Wharf; 1,150-foot face; 17 feet alongside; 1½-million-bushel grain elevator; loading capacity 40,000 tons per hour; shipment of grain.

Keefer Terminal Ocean Vessel Shed: S side of slip opposite S harbor entrance; 600-foot face; 28 feet alongside; 59,000 square feet covered storage; water connections; operated by Lakehead Shipping Co.

Terminal Lake Vessel Shed: SW side of S dredged basin; 1,800-foot face; 26 feet alongside; 310,000 square feet covered storage; mobile cranes; water connections; operated by Canada Steamship Lines.

Facilities on the N side of Kaministiquia River:

Imperial Oil Wharf: N side of the river mouth; 40-foot face plus breasting dolphins; 23 feet alongside; bunkering vessels.

Canadian Pacific Wharf: 0.45 mile below Jacknife Bridge; 1,200-foot face; 25 feet alongside; 4,000 square feet covered storage.

St. Lawrence Cement Co. Dock: about 0.3 mile below Jacknife Bridge; 300-foot face; 25 feet alongside; shipment of bulk materials.

Saskatchewan Pool No. 8: just below Jacknife Bridge; 1,000-foot face; 25 feet alongside; 3-million-bushel grain elevator; loading capacity 45,000 bushels per hour; shipment of grain; operated by Industrial Grain Products.

Barnett-McQueen Co. Wharf: just above Jacknife Bridge; 930-foot face; 22 feet alongside.

Superior Grain By-Products Wharf: 1.6 miles above Jacknife Bridge; 770-foot face; 21 to 24 feet alongside; 1¾-million-bushel grain elevator; loading capacity 40,000 bushels per hour; shipment of grain.

Western Engineering Services Wharf: just below swing bridge; 900-foot face; 23 feet alongside.

Western Metals Corp. Wharf: about 0.1 mile above swing bridge; 300-foot face; 16 feet alongside; 100,000 square feet covered storage.

Western Metals Corp. Upper Wharf: 0.25 mile above swing bridge; 100-foot face; 20 feet alongside; 17 acres open storage; cranes to 45 tons; handling of heavy-lift cargo and scrap metal.

Great Lakes Paper Co., Ltd. Wharf: SW side of Westfort Turning Basin; 1,150-foot face; 25 feet alongside.

Facilities on the S side of Kaministiquia River:

Thunder Bay Terminals Ltd. Wharf: (48°23′28″N., 89°12′52″W.); 730 feet of berthing space; 30 feet alongside; bulk coal handling facility.

Incan Superior Ltd. Wharf: SE side of slip on S side of river mouth; 1,150-foot face; 15 to 21 feet alongside; stern loading ramp.

Shell Canada Wharf: 0.7 mile below Jacknife Bridge; 72-foot face; 25 feet alongside; oil storage tanks.

Allied Chemicals Ltd. Wharf: 1.1 miles below swing bridge; 570-foot face; 20 feet alongside; handling of calcium chloride.

Facility in McKellar River:

Texaco Canada Wharf: N side of the river about 1.1 miles above the mouth; 21 feet alongside.

Facilities in Mission River:

Thunder Bay Generating Station Wharf: N side of the river mouth; 680-foot face; 27 feet alongside; receipt of coal.

Port Arthur Lumber and Planning Mill Wharf: N side of river 1.3 miles above mouth; 600-foot face; 17 to 20 feet alongside.

Gulf Oil Wharf: N side of the head of the river; 150-foot face plus breasting dolphins; 23 feet alongside; petroleum products.

Abitibi Paper Co. Ltd. Wharf: S side of S slip in the basin at the river mouth; 2,120-foot face; 18 to 21 feet alongside; paper products.

Cargill Wharf: across slip N of Abitibi Paper Co. Ltd. Wharf; 1,700-foot face; 21 feet alongside; 5¾-million-bushel grain elevator.

Saskatchewan Pool No. 15 Wharf: S side of N slip in the basin at the river mouth; 1,350-foot face; 27 feet alongside; 5½-million-bushel grain elevator; loading capacity 80,000 bushels per hour; shipment of grain.

Valley Camp Coal Dock: S side of the river 0.8 mile above the mouth; 1,275-foot face; 24 to 26 feet alongside; cranes to 25 tons; 50,000-ton salt storage building; handling of coal, zinc concentrate, sulphur, limestone, scrap iron and steel products.

Valley Camp Iron Ore Dock: S side of the river 1.25 miles above the mouth; 730-foot face along dolphins; 27 feet alongside; loading of iron ore by conveyor.

Supplies.–Fresh provisions and all kinds of marine supplies are available at Thunder Bay. Bunkering is available at the Imperial Oil Wharf on the N side of the mouth of Kaministiquia River. Other companies supply bunker fuel by truck. Water is available at Keefer Lakehead Terminal and Ocean Vessel Sheds at the S end of the N section of the harbor.

Repairs.–Port Arthur Shipbuilding Co. makes all types of ship repairs at a graving dock at the N end of the N section of the harbor. The drydock is 747 feet long with a width of 86 feet at the bottom and a depth of 16 feet over the sill. The fitting-out berth just E of the drydock has a reported depth of 21 feet alongside and cranes to 80 tons. Two companies in the harbor supply divers for underwater inspections and repairs.

Small-craft facilities.–Two marinas on the W side of the N section of the harbor opposite the middle entrance provide transient berths, gasoline, diesel fuel, water, sewage pump-out, marine supplies, and small-craft repairs. A launching ramp is on the W side of Kaministiquia River at the junction with Mission River.

Communications.–Thunder Bay has highway and rail connections with other major cities. Thunder Bay Airport is on the SW side of the city.

Charts 14968, *2301.–The N shore of Thunder Bay, from **Bare Point** NE for 20 miles to its head, can generally be approached within 1 mile. **Papoose Islands,** 1 mile E of **Wild Goose Point** (48°29.4'N., 89°03.5'W.), are surrounded by shoals for 600 feet. **Mary Harbour,** 3 miles NE of Wild Goose Point, has good anchorage in depths of about 30 feet, clay bottom. **Mary Island** encloses the bay on the SE side. **Mackenzie Bay,** 2 miles NE of Mary Island, is generally shallow and rocky. **Lefebvre Island** and **Bacon Island** are two small islands in the mouth of the bay. **Amethyst Bay,** just NE, is separated from Mackenzie Bay by **Conmee Point.** The bay has deep water within 0.3 mile of shore, but is obstructed by several small islands and their surrounding shoals including **Buck Islands, Kent Islands,** and **Palette Island. Amethyst Harbour,** at the E end of Amethyst Bay, is enclosed on the S by **Lambert Island** and provides shelter for small boats in all winds. A Government wharf on the NE side of the harbor has a depth of 5 feet alongside. **Caribou Island,** 2.2 miles long E and W, is 1 mile SE of Lambert Island. Anchorage with fair protection is on the N side of the E end of the island in depths of about 36 feet, clay bottom. **Temple Rock,** covered 2 feet and marked on the S side by a buoy, is 0.5 mile W of Caribou Island. **Chipman Rock,** covered 5 feet, and **Sour Island,** surrounded by shoals, are N of Caribou Island in the bight between **Perry Point** and **Knobel Point.** The head of Thunder Bay has anchorage 0.5 mile from shore in depths of 36 to 48 feet, mud bottom.

The E shore of Thunder Bay, for 20 miles SSW from its head to Thunder Cape, is bold and generally deep-to. **Clavet Bay,** about midlength of the E shore on the S side of **Clavet Point,** is open to the SW and has anchorage in depths of 36 feet, sand bottom. **Hoorigan Bay** is 4 miles SSW on the S side of **Hoorigan Point.** This bay is also open to SW and has anchorage in depths of 36 feet, clay bottom. **Sawyer Bay,** 5.5 miles NE of Thunder Cape, has anchorage with protection from E and S winds in depths of about 36 feet, clay bottom.

Charts 14960, 14961, *2300.–The N shore of Lake Superior from Thunder Cape E to the head of St. Marys River is not described in detail in this Pilot. This area is fully described in Canadian Sailing Directions, Great Lakes, Volume II, published by the Canadian Hydrographic Service and sold by the Hydrographic Chart Distribution Office. (See appendix for addresses.)

Charts 14968, *2301.–From Thunder Cape E for 10 miles to the entrance to Black Bay, the shore is a series of small bays. A chain of islands and shoals parallels this stretch about 1.7 miles offshore. Strangers and vessels at night or in thick weather should keep well to the S of these dangers. **Trowbridge Island,** the southwesternmost of the chain, is 3 miles ESE of Thunder Cape. **Trowbridge Island Light** (48°17.6'N., 88°52.4'W.), 114 feet above the water, is shown from a white octagonal tower on the summit of the island; a fog signal is at the light. **Sand Islands,** 5.7 miles NE of Trowbridge Island, are at the NE end of the island chain. The three small islands are on a shallow ledge 0.5 mile from shore on the W side of the entrance to Black Bay. **Skinaway Island** is the northeasternmost of the group. **Maloney Shoal,** covered 13 feet, is about 1 mile SW of the Sand Islands.

Silver Islet, Ont., is a village on the S shore of Sibley Peninsula about 6 miles NE of Thunder Cape. The village is protected on the W by **Church Point** and on the SE by **Burnt Island,** which lies close to the shore. The approach to the village, between the ledge off Church Point and a 4-foot spot SW of Burnt Island, is marked by a **053°** unlighted range. A Government wharf at the village has a depth of 11 feet along the S and E sides. A mooring basin is on the E side of the wharf, between it and an adjacent breakwater. SW winds cause a rough sea at the wharf. A launching ramp is at the wharf, and gasoline and supplies are available in the village.

Charts 14968, *2301, *2313.–Black Bay, enclosed between Sibley Peninsula on the W and **Black Bay Peninsula** on the E, extends about 35 miles NNE. The bay has a least width of about 2.5 miles near the S end and increases to about 10 miles wide near its head. The bay has depths of 30 feet or more in the lower 25 miles and then shoals gradually toward the head. Several small islands are in the upper part of the bay.

Edward Island is the largest of a group of islands in the middle of the entrance to Black Bay. **Point Porphyry Light** (48°20.4'N., 88°38.9'W.), 82 feet above the water, is shown from a tower with a white slatwork daymark on the S point of **Porphyry Island,** just S of Edward Island. A fog signal is at the light.

Local magnetic disturbance.–Large magnetic disturbances have been reported near Point Porphyry.

Clark Island, Gravel Island, Cranberry Island, and a chain of reefs and isolated rocks are in midchannel of the entrance to Black Bay W of Edward Island. **Middlebrun Channel** leads into the bay W of these islands, between them and Sand Islands. **Montreal Channel,** E of the islands, is wider and deeper and is the preferred route into Black Bay. **Magnet Channel** leads into Black Bay between the E side of Edward Island and **Magnet Island.** This channel is bordered by dangerous shoals and should not be attempted without local knowledge.

Hurkett Cove, at the NW end of Black Bay, is entered through a narrow channel with a controlling depth of 7 feet in 1980. A Government wharf in the cove has a depth of 7 feet alongside.

Charts 14968, *2301, *2302.–From Point Porphyry Light NE for about 29 miles to Lamb Island Light, a continuous chain of islands, shoals, and reefs render inshore navigation dangerous.

Local magnetic disturbance.–Differences of as much as 40° to 50° from normal variation have been observed in the area of Magnet Island on the E side of the entrance to Black Bay.

Chart *2302.–Shesheeb Bay, 7.5 miles W of Lamb Island Light, is entered through **Roche debout Channel** between **Shesheeb Point** on the W and **Otter Island** on the E. The bay is open to SE, and as the water is deep, the bay is not recommended for anchorage. **Manuel Rock,** covered 9 feet, is 0.3 mile W of Otter Island, and a 10-foot spot is off Shesheeb Point.

Otter Cove extends 2.8 miles NE from Otter Island. Anchorage with good shelter is near the head of the cove in depths of 30 to 54 feet, mud bottom.

Charts *2302, *2312.–Lamb Island is in the entrance to Nipigon Strait. **Lamb Island Light** (48°36.2'N., 88°08.6'W.), 99 feet above the water, is shown from a tower near the center of the island; a fog signal is at the light. A red and white tower is close SW of the light. **Sovereign Rock,** covered 11 feet, is 0.8 mile SSW of the light, and a 7-foot spot is 0.2 mile N of the rock. **Newcombe Rock,** awash, is 0.3 mile N of the light, and a 5-foot spot is just W.

Chart *2312.–Nipigon Bay is about 35 miles long from Wilson Island at the E end to the mouth of Nipigon River at the W end and has a maximum width of about 15 miles. The bay is enclosed on the S side by **St. Ignace Island, Simpson Island, Vein (Salter) Island,** and **Wilson Island.** Five channels lead into the bay, from W to E: Nipigon Strait, Moffat Strait, Simpson Channel, Wilson Channel, and Schreiber Channel.

Local magnetic disturbance.–Differences of 1° to 7° from normal variation have been observed between Fluor Island and Wilson Island.

Nipigon Strait is entered between Lamb Island on the W and **Fluor Island** on the E and extends N for about 13 miles to the SW end of Nipigon Bay. The lower part of the strait is deep and wide, thence opposite the N end of Fluor Island a narrow channel marked by buoys and a **014°30'** lighted range leads between shoals and small islets. Above Fluor Island, vessels should favor the W side of the strait for 3 miles, thence follow a midchannel course to Nipigon Bay. Because of the narrows W of Fluor Island, local knowledge is recommended for transiting the strait. Good anchorage is found throughout the strait in depths of 36 feet and more, mud bottom.

Blind Channel, leading into Nipigon Strait between Fluor Island and St. Ignace Island, has a least depth of 2 feet and is not navigable.

Charts *2303, *2312.–Moffat Strait, 15 miles NE of Fluor Island, leads N between St. Ignace Island and Simpson Island. It is very shallow and narrow at the N end where it enters Nipigon Bay and is usable only by vessels drawing less than 15 feet. The strait is entered from the lake between **Bead Island** on the W and **Grotto Point** on the E. The point should be given a wide berth. Above Bead Island, the strait has excellent anchorage in depths of 6 to 16 fathoms, sand and mud bottom.

Simpson Channel, 8 miles E of Moffat Strait, extends into Nipigon Bay between Simpson Island and Vein (Salter) Island. The channel is free of dangers and is the safest and most used entrance to Nipigon Bay. **Battle Island Light** (48°45.1'N., 87°33.4'W.), 118 feet above the water, is shown from a white octagonal tower on the W end of **Battle Island,** 1.3 miles S of Vein Island on the E side of the entrance to Simpson Channel. A fog signal and a radiobeacon are at the light.

Wilson Channel enters Nipigon Bay between Vein Island and Wilson Island. **Tracy Shoal,** with a least depth of 16 feet, extends W from the N end of Wilson Island and reduces the channel width to 0.2

mile. A depth of 36 feet can be carried through the channel in good visibility, but at night or in thick weather, the channel is not recommended for craft drawing more than 14 feet.

Schreiber Channel, the shortest route for small vessels bound for Nipigon Bay from E, is enclosed on the N by the mainland and on the S by a group of islands of which Wilson Island and **Copper Island** are the largest. The channel should not be used at night or in low visibility, when Simpson Channel is recommended. **Bread Rock,** covered about 3 feet, is 1.5 miles SE of Copper Island in the E entrance to the channel and is marked on the NE side by a buoy. **McGarvey Shoal,** covered 2 feet, is 0.5 mile N of the W end of Copper Island and is marked on the NE side by a buoy. The W end of Schreiber Channel, N of Wilson Island, is obstructed by **Channel Island, Quarry Island,** and **Healey Island,** with narrow channels between. A buoy marks the outer end of a shoal spit that extends N from Channel Island.

Chart *2312.–Nipigon Bay is obstructed by several shoals and rocks. **Powder Shoal (Barwis Rock),** awash, is near midbay 2.3 miles NW of Vein Island and is marked on the W side by a lighted buoy. **Rolette Shoal,** boulders covered 3 feet, is 0.4 mile NW of Vein Island. In the W end of the bay, N of Nipigon Strait, **Vert Island, Ile La Grange, Burnt Island, Outan Island,** and **Frog Island** form a group connected to the shore of St. Ignace Island S by a shoal bank with depths of 5 to 24 feet. The NE side of Vert Island is marked by a light. **Brule Shoal,** covered 3 feet, is 1.5 miles E of the SE point of Vert Island. Ile La Grange and Outan Island are connected by a very shallow rocky bank. **Piledriver Shoal,** awash, is 0.6 mile SSE of Outan Island. Frog Island, 2 miles SW of Outan Island, is surrounded by rocks and boulders. Depths of 10 to 16 feet extend 1.5 miles W from Frog Island and N and NE to fill the entire area between it and Burnt Island, Ile La Grange, and Outan Island. N of Ile La Grange, a narrow channel of deep water leads between it and the shoals that extend off the N shore of the bay. The S edge of these shoals is marked by a buoy and a lighted buoy. **Crichton Island,** at the E end of the shoals and 1.2 miles NW of Vert Island, is marked on the SE point by a light.

The N shores of Simpson Island and St. Ignace Island as far W as **Burnt Point** (48°51.6'N., 87°55.7'W.) have steep sandstone cliffs and are generally deep-to. A 9-foot spot is 0.3 mile from shore 1.5 miles W of Burnt Point. Rocks covered 21 and 17 feet are 0.4 and 1.3 miles N of this shoal, respectively. The N sides of Vert Island and Ile La Grange are deep-to. **Clay Shoal,** a 17-foot spot marked on the N side by a buoy, is 1 mile W of Ile La Grange. Shoals extend up to 1.8 miles off the W shore of Nipigon Bay.

Red Rock, Ont., is a small village on the W side of Nipigon Bay 4 miles W of Ile La Grange. St. Lawrence Corp. Ltd. receives limestone and oil and ships liner-board from a 460-foot L-shaped wharf at the village. The approach to the wharf is marked by a **270°05'** private lighted range. The berth along the outer face of the wharf is periodically dredged to 22 feet but is subject to silting. **Nipigon River** flows into the NW corner of Nipigon Bay. The N shore of the bay has several indentations including **Kama (Mazokamah) Bay, Mountain Bay, Gravel Bay,** and **Pays Plat Bay.** At **Cooper Point,** N of Vert Island on the W side of the entrance to Kama Bay, rocks and boulders extend 0.5 mile E and S. **MacInnes Point,** 7.4 miles SE of Cooper Point, is marked by a light. Shoals extend 1 mile SSE from the point and are marked on the outer edge by a buoy. **Grant Point,** 4.5 miles ESE of MacInnes Point, is on the W side of the entrance to Mountain Bay. Shoals and rocks extend 0.8 mile S and SSW from the point. The NW side of Mountain Bay is shoal. **Oldman Shoal,** covered 19 feet, is in the E part of Gravel Bay. **Powder Islands,** in the entrance to Pays Plat Bay, are surrounded by shoals and should be approached with caution.

Rossport Harbour is a well-sheltered small-craft harbor N of Quarry Island at the W end of Schreiber Channel. A light on the NW point of a small island just NW of Quarry Island marks the entrance to the harbor from SW. The harbor has anchorage with excellent protection in depths of 6 to 16 fathoms, mud bottom. **Rossport, Ont.,** is a village on the N side of the harbor. An L-shaped Government wharf at the village has depths of 14 to 18 feet along the S face. A rock covered less than 6 feet is 300 feet E of the outer end of the wharf. A marina close NW of the Government wharf provides gasoline, diesel fuel, ice, electricity, sewage pump-out, marine supplies, and small engine repairs. The marina wharf has depths of 1 to 2 feet alongside. A crib covered 2 feet is at the S end of the marina wharf.

Charts *2302, *2312.–The S shores of Fluor Island and St. Ignace Island are generally fringed by islands and shoals as much as 3 miles from shore. **Armour Harbour,** near the SE end of St. Ignace Island, offers the best anchorage in this stretch. The harbor is enclosed on the SW side by **Armour Island** and offers anchorage with protection from all winds in depths of about 30 feet, mud bottom. The preferred approach to the harbor is from SW between **Fraser Point** and **Hope Island,** taking care to avoid the submerged rocks that extend from both.

Charts *2303, *2312.–The S shore of Simpson Island should be given a berth of 1 mile; extreme caution is advised when entering the harbors along it. **Woodbine Harbour,** at the W end of the island, has limited anchorage for small craft with excellent protection in depths of 30 feet, mud bottom. **Morn Harbour,** at the E end of the island, has excellent, but limited, anchorage with excellent protection from all winds in depths of 18 to 30 feet, mud bottom.

Charts *2303, *2304.–From Nipigon Bay E for 42 miles to Peninsula Harbour, the N shore of Lake

Superior is indented by many bays. The shores are rocky, and there are many outlying rocks and reefs.

Les Petits Ecrits is a group of small rocky islands close to shore 4 miles ESE of Schreiber Point, the E side of the entrance to Schreiber Channel. **Terrace Bay,** 2.5 miles NE of Les Petits Ecrits, is quite open to S. Anchorage is possible for small craft in the NE part of the bay in settled weather.

Charts *2303, *2304, *2305.–Jackfish Bay, 8 miles E of Terrace Bay, is a good harbor of refuge. **Cape Victoria** (48°46.4'N., 87°00.4'W.), on the W side of the entrance, is a bold and deep-to headland. **St. Patrick Island,** near the middle of the bay just inside the entrance, is marked on the W end by a light. The bay is entered W of the island. The NE arm of the bay has anchorage in depths of 10 fathoms, mud bottom, but the holding ground is reported not to be the best, and two anchors are advised if strong winds are expected. Two overhead power cables with clearances of 95 and 43 feet cross the head of the NE arm.

Moberley Bay, the NW arm of Jackfish Bay, is difficult to enter, and the islands in its mouth do not afford much protection for anchorage.

Slate Islands are a group of islands from 5.5 to 10.5 miles S of Cape Victoria. **Slate Islands Light** (48°37.3'N., 86°59.8'W.), 224 feet above the water, is shown from a white octagonal structure on the S extremity of **Patterson Island,** the southernmost and largest of the group. A fog signal and a radiobeacon are at the light. Rocks and shoals extend no more than 0.2 mile from the E, S, and W shores of Patterson Island. **Sunday Harbour,** entered W of Slate Islands Light, is not recommended for anchorage, because it has poor holding ground and is exposed to S and SW winds. The islands in the N part of the group are surrounded by rocks. **Frank Rock,** 4 feet high, and **Dahl Shoal,** covered 8 feet, are 0.5 mile off the N shore of **Mortimer Island,** the NW island of the group. **McGreevy Harbour,** in the N shore of Patterson Island, has shelter for small craft, but the water is deep and the holding ground poor.

Leadman Islands, a group of small islands surrounded by rocks and shoals, are 2 miles E of the N part of the Slate Islands.

Charts 14960, 14961, *2300.–Superior Shoal, with a least depth of 21 feet, is near midlake, 39 miles S of Slate Islands Light in about 48°04'N., 87°07'W. The shoal should be given a wide berth at all times.

Chart *2304.–Ashburton Bay is a deep open bight between **Bottle Point** (48°44.7'N., 86°51.8'W.) on the W and **Guse Point** on the E. **McKellar Harbour,** at the N end of the bay, has good protection for small craft behind the large island in its mouth in depths of 9 fathoms, clay bottom. **Barclay Islands** are in the S approach to the harbor, and **Fitzsimmons Rocks** are in the SW approach.

Pic Island is a bold, irregularly shaped island 0.5 mile S of Guse Point. **Thompson Channel,** the deep channel between the two, is obstructed by **Nicoll Shoal,** covered 13 feet, 0.3 mile SW of Guse Point. Numerous rocks and shoals extend from 1.5 to 3.5 miles E of Pic Island and reach 3 miles S from the mainland shore E of Guse Point.

Local magnetic disturbance.–Magnetic disturbances have been reported in the vicinity of Pic Island and Peninsula Harbour, as much as 40° to 50° near Pic Island.

Charts *2304, *2306.–Peninsula Harbour is at the E end of the extreme N shore of Lake Superior between **The Peninsula** on the SE and **Ypres Point** on the NW. **Hawkins Island,** marked at the S end by a light, is in the middle of the harbor entrance, and vessels may enter the harbor N or S of it. **Manitoba Shoal,** with depths less than 6 feet, is in the middle of the N harbor entrance. **Senlis Shoal,** covered less than 6 feet, is 600 feet E of Hawkins Island.

Marathon, Ont., is a town on the SE side of Peninsula Harbour at the head of **Jellicoe Cove.** The cove has anchorage with good protection in depths of 7 fathoms, sand bottom. Caution is advised to avoid the intake pipeline near the head of the cove. The E part of the cove is a log storage area. American Can of Canada operates a 460-foot wharf on the SW side of Jellicoe Cove. The wharf has reported depths of 10 feet at the inner end to 21 feet at the outer end. Salt, coal, oil, and limestone are received, and woodpulp is shipped. Diesel oil is available by truck. Water and small repairs to small craft are available in an emergency.

Charts *2304, *2308, *2309.–From Peninsula Harbour, the shore of Lake Superior trends SSE for 45 miles to Otter Island, thence 20 miles SE and 40 miles E to Michipicoten Harbour. This shore is bold and rocky and is indented with many coves and harbors that afford shelter for small craft in N and E gales. Numerous rocks and reefs extend up to 1 mile offshore. The shore in this stretch should be approached with extreme caution.

Charts *2304, *2318.–Heron Bay, 6 miles SSE of Peninsula Harbour, has anchorage with protection from all but W winds in depths of about 40 feet, sand bottom. A 322-foot wharf with a depth of 21 feet alongside is on the N side near the head of the bay. The wharf was in ruins in 1978. The approach to the wharf is marked by buoys, as are several dangers in the bay.

Local magnetic disturbance.–Magnetic disturbances have been reported near **Sewell Point,** 15 miles SSE of Heron Bay.

Charts *2308, *2309, *2310.–Otter Head, 47 miles SSE of Peninsula Harbour, encloses the W side of **Otter Cove. Otter Island** extends 0.4 to 2.3 miles NW from Otter Head. **Otter Island Light** (48°06.7'N., 86°04.0'W.), 97 feet above the water, is shown from a white tower on the NW end of the island; a fog signal is at the light. A reef with a depth of 8 feet at the outer end extends 0.8 mile NW from the light. Buoys mark the outer end of two shoals that extend from shore inside Otter Island. A 20-foot spot 0.3 mile SE of the island is also marked by a buoy. **Old Daves Harbour**, between the N end of Otter Island and a small islet, has good anchorage for small craft in depths of 12 feet. Larger vessels can anchor 0.4 mile N of the SE point of Otter Island with fair protection in depths of 15 to 20 fathoms, sand bottom. Otter Cove has anchorage for small craft with excellent protection in depths of 30 feet, sandy clay bottom.

Michipicoten Island, 17 miles long and 6.5 miles wide, is 9.2 miles S of the mainland shore near the bend SE of Otter Island. **Michipicoten Island Light** (47°45.3′N., 85°35.8′W.), 84 feet above the water, is shown from a white hexagonal tower on **Point Maurepas,** the E point of the island. A fog signal and a radiobeacon are at the light. A light is on a small island close off the SW side of the island. The N shore of Michipicoten Island is fairly deep-to. The S shore should be approached with caution as many islets and reefs extend 1.3 miles off. Reefs extend 1 mile off the NW shore.

Charts *2308, *2309, *2310, *2315.–Quebec Harbour, midlength of the S shore of Michipicoten Island, has good anchorage with protection from all winds in depths of 5 to 8 fathoms, mud bottom. **Davieaux Island** and **Hope Island** are 0.8 mile S of the entrance to Quebec Harbour. The channel between the islands, obstructed by shoals extending from each and by a detached 23-foot spot, is marked by a **000°45′** lighted range, thence the channel across the bar at the mouth of Quebec Harbour is marked by the lighted range and buoys. A **050°** unlighted range marks the approach to the bar channel from SW. **Davieaux Island Light** (47°41.7′N., 85°48.7′W.), 129 feet above the water, is shown from a white hexagonal tower on the summit of the island; a fog signal is at the light.

Local magnetic disturbance.–Differences of 7° to 14° from normal variation have been observed in the entrance to Quebec Harbour.

Charts *2309, *2310.–Cozens Harbour, at the SE end of Michipicoten Island, has anchorage for small craft with protection from all but S winds.

Chart *2310.–Caribou Island, 22 miles S of Michipicoten Island, is 3.5 miles long and 1.5 miles wide. **Caribou Island Light** (47°20.4′N., 85°49.5′W.), 99 feet above the water, is shown from a hexagonal structure on a small island 0.75 mile SW of Caribou Island; a fog signal, a radiobeacon, and a radar transponder beacon (Racon) are at the light. (See Racons, chapter 1, for additional information.) Depths of 24 feet or less extend up to 1.5 miles from the island. **North Bank,** with depths of 31 feet near the outer end, extends 5 miles N from the island.

Caution.–Extreme caution is advised when navigating between Michipicoten Island and Caribou Island because of the possible existence of unreported shoals.

Charts *2309, *2315.–Michipicoten Harbour is a cove on the N side of **Michipicoten Bay,** about 35 miles ENE of Michipicoten Island. **Michipicoten Harbour Light** (47°56.6′N., 84°54.5′W.), 88 feet above the water, is shown from a skeleton tower on the SE extremity of **Perkwakwia Point,** the NW entrance point to Michipicoten Bay. A fog signal and a radiobeacon are at the light. A white oil tank W of the harbor is prominent. A **355°** private lighted range marks the entrance to the cove.

Algoma Central Railway operates a 1,500-foot wharf on the W side of Michipicoten Harbour. The wharf has a reported depth of 20 feet along the outer 1,300 feet. A coal loader on the wharf has a capacity of 2,500 tons per hour. Small craft can obtain gasoline at another wharf just E.

Oakes Cove, just SW of Michipicoten Harbour, has good shelter with anchorage for shallow-draft vessels in depths of 6 to 12 feet, sand bottom.

Michipicoten River empties into the E side of Michipicoten Bay. A light marks the N side of the river mouth. The river is navigable by craft of 3-foot draft for about 1 mile to the village of **Michipicoten River, Ont.** Strong currents, a shifting sandspit on the S side of the mouth, and a 5-foot crib in the mouth make navigation of the river hazardous, and it should not be attempted without local knowledge. A marina at the village provides berths, gasoline, diesel fuel, water, ice, electricity, marine supplies, engine repairs, and sewage pump-out. A 45-foot marine railway is available.

Chart *2309.–From Michipicoten River SW for about 9 miles to **Brule Point,** the shore is bluff and deep-to. **Brule Harbour,** 1 mile SE of the point, has good anchorage near the head of its N arm in depths of 13 fathoms. The SE arm, small with a very narrow entrance, is suitable only for small craft.

From Brule Point, the shore trends SSW for about 16 miles to **Cape Gargantua** (47°35.8′N., 85°02.1′W.). The shore is steep, and deep water is within 0.2 mile of shore except at the cape. **Indian Harbour** is in the SE corner of the bay on the NE side of Cape Gargantua. The harbor has good anchorage with protection from all winds in depths of 30 feet, mud bottom.

Local magnetic disturbance.–Slight magnetic disturbances have been observed on **MacKinnon Bank,** 4 miles N of Cape Gargantua.

Charts *2309, *2307.–A group of small islands and rocks is close to shore from Cape Gargantua SE for about 3 miles. **Hursley Island,** W of the cape, is marked on the NW side by a light. **Devils Warehouse Island,** near the S end of the group, is the largest. **Pannikin Shoal,** a rock covered 14 feet, is 0.6 mile S of Hursley Island and is the only shoal outside the line of the islands. Local knowledge is recommended for navigating the channels between the islands. **Warp Bay,** inside the islands, has limited anchorage with good protection in depths of 42 feet, mud bottom.

Charts *2309, *2307, *2315.–Gargantua Harbour is a small cove at the N end of **Gargantua Bay,** 4 miles SE of Cape Gargantua. **Gargantua Island,** marked at the S end by a light, is off the N entrance point to the bay. The entrance to the harbor S of the island is recommended. Anchorage with fair shelter is NE of the island in depths of 42 to 60 feet, sand bottom. Small craft can anchor farther into the harbor in depths of 30 to 48 feet, mud bottom.

Chart *2307.–From Cape Gargantua, the shore trends SE for 30 miles, thence SSW for about 23 miles to Coppermine Point. The shoal border is no more than 0.3 mile wide except at the S end of the stretch, but numerous outlying islands and shoals must be avoided.

Ella Islet, 9 miles SE of Cape Gargantua, is surrounded by shoals for a distance of 0.6 mile on the NE side decreasing to 0.1 mile on the SW side.

Leach Island is 1.3 miles S of Ella Island. Shoals extend 0.3 mile from the island except the S end where a shoal with a depth of 5 feet at the outer end extends 0.5 mile SW. **Sparrow Shoal,** boulders covered 12 feet, is 1.4 miles W of Leach Island. Two 23-foot spots are between the island and shoal.

Lizard Islands is a group of seven small islands 5 miles ESE of Leach Island and 1.4 miles from the mainland shore. **Rowe Island,** the northeasternmost of the group is marked on the NE point by a light. A deep channel 1 mile wide leads between this island and the mainland. The islands are completely surrounded by rocks and shoals and passage between them should not be attempted.

Ganley Rock, covered 18 feet, is 3 miles SE of Rowe Island. A shoal covered 21 feet is 0.4 mile WSW of the rock.

Charts *2307, *2315.–Sinclair Cove is a small-craft harbor 18 miles SE of Gargantua Harbour and 2.9 miles SE of Ganley Rock. **Sinclair Island,** in the mouth of the cove, is marked on the SW side by a light. The cove is entered S of the island. The cove is exposed to W and SW seas and should only be used in settled weather. In 1979, the wharf on the S side of the cove was in disrepair.

Chart *2307.–Agawa Islands, SE of Sinclair Cove, is a group of small islands and rocks that extend about 1 mile from shore. Anchorage for small craft with good protection from W winds is on the N side of **Ganley Island** in the N part of the group. **Agawa Bay,** E of the Agawa Islands, affords anchorage with fair protection.

Griffon Reef, with rocks awash, is 2.8 miles SW of Sinclair Island and 3.5 miles S of Ganley Rock. **Montreal Island** is 1.5 miles S of Griffon Reef. Shoals extend 0.2 to 0.5 mile from the island.

Charts *2307, 14962.–Montreal Shoal, with a least depth of 6 feet, extends from 3.2 to 4.7 miles S of Montreal Island.

Montreal River empties into Lake Superior E of Montreal Shoal. The mouth of the river is a small bay between two points; a light marks the S point. A wharf on the S side of the bay is in ruins. In 1974, the channel across the bar at the head of the bay had a controlling depth of 3 feet, but the channel shifts frequently and the currents at the bar are strong, making passage into the river hazardous. Local knowledge is advised. A marina in a basin just inside the bar provides transient berths, gasoline, water, and ice. Rapids and a dam block the river about 0.1 mile above the entrance.

Alona Bay, enclosed between **Theano Point** (47°10.9′N., 84°42.5′W.) on the N and **Pointe aux Mines** on the S, is 5.5 miles SSW of Montreal River. Each of the points has a prominent pink-colored rock base. **Ossifrage Island** is off the SW side of Theano Point. The bay is entered S of the island, and anchorage is E of the island in depths of 12 to 15 fathoms, mud bottom. A sheer, light-colored cliff 2.9 miles NE of Theano Point is prominent. **Mica Bay,** 5 miles S of Theano Point, is too open and deep for anchorage.

Siesta Shoal, covered 24 feet, is 7.4 miles WSW of Theano Point. **Mica Shoal,** with a least depth of 14 feet and marked by a buoy, is 8.3 miles SW of Theano Point and 4.7 miles NW of Mamainse Point.

Charts *2307, 14962, *2315.–Mamainse Point (47°02′N., 84°47′W.) is about 41 miles SSE of Cape Gargantua. Numerous islands and shoals extend about 0.4 mile W and 0.7 mile SW from the point. **Mamainse Harbour,** on the NW side of the point, is enclosed on the W by **Mamainse Island. Mamainse Harbour Light** (47°02.3′N., 84°47.2′W.), 32 feet above the water, is shown from a mast with a red and white rectangular daymark on the N end of Mamainse Island. A radar transponder beacon (Racon) is at the light. (See Racons, chapter 1, for additional information.)

The N end of Mamainse Harbour is enclosed by a breakwater that extends from shore to a low island between the mainland and Mamainse Island. A channel with a depth of about 5 feet leads S on the E side of Mamainse Island into the harbor. A 3-foot spot is off the S end of the low island, and the S end of the harbor is foul. An overhead cable with a minimum clearance of 20 feet extends along the E side of Mamainse Island and thence across the S end of the harbor.

The Government wharf on the E side of Mamainse Harbour has a depth of 6 feet alongside. Gasoline, diesel fuel, and ice are available by arrangement at fishery wharves S of the Government wharf.

Charts *2307, 14962.–Hibbard Rock, 12 feet high, is 0.9 mile SW of Mamainse Point. **Hibbard Bay,** 1 mile S of Mamainse Point, has depths of 18 to 36 feet, hard bottom.

Coppermine Point, on the E side of the entrance to Whitefish Bay, is about 34 miles NNW of the head of St. Marys River. **Coppermine Point Light** (46°59.1′N., 84°47.2′W.), 57 feet above the water, is shown from a circular skeleton mast with a red and white rectangular daymark on the point. A lighted radio tower 4.2 miles E of the light is prominent. **Coppermine Rock,** 27 feet high, is 0.4 mile WNW of the light. A 12-foot spot is 0.3 mile NNW of the rock and a 6-foot spot is 0.3 mile SSE.

Chart 14962.–From Coppermine Point, the shore extends SE for 4 miles to **Pancake Point** on the W side of the entrance to **Pancake Bay. Whiskey Rock,** covered less than 6 feet, is about 0.3 mile from shore on the W side of Pancake Point. From Pancake Bay, the shore extends S to **Corbeil Point,** 10.3 miles SE of Coppermine Point. Shoals extend 0.9 mile S from Corbeil Point and are marked on the outer edge by a lighted buoy.

Pancake Shoal, with a least depth of 4 feet and marked on the N side by a buoy, is 4.5 miles SW of Pancake Point. **Outer Pancake Shoal,** close SW of Pancake Shoal, has a least depth of 15 feet and is marked on the W side by a lighted buoy.

Batchawana Bay, a deep indentation on the E side of Whitefish Bay, is entered between Corbeil Point on the N and **Rudderhead Point** on the S. **Batchawana Island,** near the middle of the bay, is connected to the S shore by a rocky flat across which a depth of 8 feet can be carried. A narrow channel leads between the N side of Batchawana Island and the mainland to **Harmony Bay.** This channel has general depths of 24 feet, but it is reported that only 9 feet can be carried through it. A Government wharf with a depth of 11 feet along the N face is 1.5 miles NE of Corbeil Point. Gasoline is available by arrangement with a nearby resort. Anchorage with protection from all but S winds is NE of the wharf in depths of 30 to 90 feet, sand bottom. Small craft can anchor in Harmony Bay in depths of 30 to 90 feet, mud bottom.

North Sandy Island and **South Sandy Island,** 4.5 miles W of Rudderhead Point, are on a rocky bank that extends 5.3 miles N and S and 2.5 miles E and W. Buoys mark the N and SE edges of the bank. The islands are low and wooded and do not give a good radar return.

From Rudderhead Point S for about 9.5 miles to Goulais Point, the shore is generally deep-to. **Maple Island,** 3 miles S of Rudderhead Point and marked on the W side by a light, is connected to the shore by a boulder reef. The small bay SE of Maple Island is also shallow and rocky.

Charts 14962, *2315.–Goulais Bay, enclosed on the W by **Goulais Point** (46°41.2'N., 84°33.2'W.), is open to SW. A light 2 miles NE of Goulais Point marks the NW side of the entrance to the bay. **Goulais Mission,** a small settlement 0.7 mile N of the light, has a Government wharf with depths of 2 to 4 feet alongside. A launching ramp is nearby. Anchorage is available about 1 mile off the wharf in depths of 42 to 60 feet, mud bottom.

Chart 14962.–From Goulais Bay, the shore is steep and deep-to to within 1 mile of **Gros Cap,** on the NE side of the entrance to St. Marys River. Lighted radio masts on Gros Cap are prominent.

Ile Parisienne, 10 miles NW of Gros Cap and 7.5 miles W of Goulais Point, is on the NE side of the vessel route to and from St. Marys River. **Ile Parisienne Light** (46°38.7'N. 84°43.4'W.), 54 feet above the water, is shown from a hexagonal tower on the SW side of the island; a fog signal is at the light. Shoals extend about 0.9 mile N, E, and S from the island.

Parisienne Shoal, with a least depth of 7 feet, is from 2.2 to 5.2 miles NNE of Ile Parisienne and is marked on the E side by a buoy.

14. HUDSON RIVER, NEW YORK CANALS, AND LAKE CHAMPLAIN

The **Hudson River** extends N from The Battery at New York City for about 152 miles to the head of tidal navigation at the Troy Lock and Dam at Troy, N.Y. (This section of the Hudson River is described in United States Coast Pilot 2, Cape Cod to Sandy Hook.)

A Federal project provides for a 32-foot channel from New York City to Albany, thence a 14-foot channel to the Troy Lock and Dam. (See Notices to Mariners and latest editions of charts for controlling depths.)

Chart datum.–The plane of reference for depths shown on charts of the Hudson River is mean low water as far N as the upper end of Haverstraw Bay, about 38 miles above The Battery. From Haverstraw Bay to the Troy Lock and Dam, the reference plane is Hudson River Datum, which is mean low water during lowest river stages.

Charts 12348, 14786.–Troy Lock and Dam at **Troy,** N.Y., 154 miles above The Battery at New York City, is the lower entrance to the New York State Barge Canal System. The lock has a length of 492.5 feet and width of 44.4 feet, with a depth of 13 feet over the lower sill at lowest low water. The lift of the lock at lowest stages is 17.3 feet.

Regulations.–(See **33 CFR 207.50,** chapter 2, for lock regulations and signals.)

Chart 14786.–Above Troy Lock, the Hudson River extends N for about 2.3 miles to the junction of Erie Canal and Champlain Canal at **Waterford,** N.Y.

The **New York State Barge Canal System,** built and maintained by the State of New York, is a toll-free waterway providing access from the Hudson River to Lake Champlain on the E and to Lake Ontario and Lake Erie on the W. The system, comprising Champlain Canal, Erie Canal, Oswego Canal, and Cayuga and Seneca Canal, is 524 miles long, of which 370 miles are canalized rivers, streams, and lakes, and 154 miles are artificial land cuts.

Chart datum.–The plane of reference for depths shown on charts of the New York State Barge Canal System is normal pool level.

Champlain Canal, 60 miles long, follows the canalized Hudson River from Waterford N to **Fort Edward, N.Y.,** thence follows a land cut and canalized **Wood Creek** to Lake Champlain. From Waterford, 8 locks ascend 124.8 feet to the summit elevation of 140 feet about 1.3 miles NE of Fort Edward, thence 3 locks descend 43.5 feet to **Whitehall, N.Y.,** at the S end of Lake Champlain.

Charts 14786, 14788.–The **Erie Canal** is 338 miles long from Waterford W across New York State to Tonawanda on the Niagara River. From Waterford, the canal follows the canalized **Mohawk River,** a short reach of **Wood Creek,** and several interspersed land cuts to **Oneida Lake.** After passing through the lake, the canal follows **Oneida River, Seneca River, Clyde River,** and several land cuts to **Lyons,** N.Y. A 6.8-mile-long branch channel extends SE from the Seneca River through **Onondaga Lake** to **Syracuse,** N.Y. W of Lyons, the canal is an artificial channel to **Pendleton, N.Y.,** thence the canal follows Tonawanda Creek to Tonawanda. About 39 miles W of Lyons, the canal crosses the **Genesee River.** From the intersection, a 3.2-mile section of the Genesee River has been improved to provide access from the canal to Rochester. A dam on the Genesee River 7 miles downstream of the canal precludes navigable access to Lake Ontario.

The Erie Canal, from Waterford to Tonawanda, has 34 locks. At Waterford, a flight of 5 locks ascends 168.8 feet from the pool above Troy Lock and Dam around Cohoes Falls to the Mohawk River, thence 14 locks ascend the Mohawk Valley 236 feet to the summit level near Rome, N.Y., thence 3 locks descend 57 feet to Three Rivers, N.Y., at the junction with Oswego Canal, and thence 12 locks ascend 201 feet to the Niagara River.

Chart 14786.–Oswego Canal branches NW from Erie Canal about 160 miles W of Waterford at **Three Rivers, N.Y.,** at the confluence of Oneida River, Seneca River, and Oswego River. The canal, 24 miles long, is formed almost entirely by the canalized **Oswego River.** The canal descends 118 feet through 7 locks from Three Rivers to Lake Ontario. (Oswego Harbor is described in chapter 5.)

Charts 14786, 14791.–Cayuga and Seneca Canal branches S from the Erie Canal about 41 miles W of Three Rivers. The canal follows the canalized Seneca River and leads S through both **Cayuga Lake** and **Seneca Lake.** The canal is 92 miles long to **Ithaca, N.Y.,** at the S end of Cayuga Lake and to **Watkins Glen, N.Y.,** at the S end of Seneca Lake including a 2.5-mile cut to **Montour Falls, N.Y.,** S of Watkins Glen. From the Erie Canal, 1 lock ascends 7.5 feet to Cayuga Lake, and thence 3 locks ascend 64.5 feet to Seneca Lake.

Caution.–Four private special purpose lighted mooring buoys, painted red and white, mark a barge moored about 2.9 miles N of **Long Point** (42°39.4'N., 76°54.6'W.) on Seneca Lake. Three private special purpose lighted mooring buoys, painted red and white, mark a barge moored about 1 mile NE of Long Point.

Another facility of barge and buoys is 0.25 mile SW of **Portland Point** near the S end of Cayuga Lake. The barge and two mooring cables are each marked by a white buoy floodlighted at night. The

Structures across the Hudson River

**Miles above The Battery, New York City*

***Clear width in feet proceeding upstream*

No.	Location and Name	Kind	Miles*	Clear width in feet of draw or span openings**			Clear height in feet above water datum		Remarks
				Right	Left	Center	Low	High	
1	George Washington Bridge	Highway	11.0			3,169		195	Suspension. Note 1.
2	Tappan Zee Bridge	Highway	27.0	499	500	1,098		139	Fixed.
3	Overhead cables	Power	41.8					160	
4	Peekskill-Bear Mountain Bridge	Highway	46.7			1,584		155	Fixed.
5	Newburgh-Beacon Bridge	Highway	62.0	550	550	760		148	Fixed. Under construction 1979.
6	Newburgh-Beacon Bridge	Highway	62.0	550	550	960		150	Fixed. Note 2.
7	Poughkeepsie-Mid-Hudson Bridge	Highway	75.6	520	450	1,458		137	Suspension. Note 3.
8	Poughkeepsie-ConRail bridge	Railroad	76.1			490		167	Fixed.
9	Kingston-Rhinecliff bridge	Highway	94.3	760	760			135	Fixed.
10	Catskill-Rip Van Winkle Bridge	Highway	113.6			760		146	Fixed.
11	Overhead cables	Power	116.2					145	
12	Overhead cable	Power	135.5					185	
13	Castleton-ConRail bridge	Railroad	135.6	75	566	371		139	Fixed. Clearance is for left span.
15	Castleton-N.Y. Thruway bridge	Highway	135.7			552		135	Fixed.
16	Overhead cable	Power	141.9					169	
17	Overhead cable	Power	142.1					194	
18	South Mall Expressway bridge	Highway	145.4			300		60	Fixed.
19	Albany-ConRail bridge	Railroad	146.2	103	98			25	Swing. Note 4.
20	Overhead cable	Power	146.2					135	
21	Overhead cable	Power	146.8					88	
22	Albany-Patroon Isle bridge	Highway	147.2			300		60	Fixed.
23	Overhead cable	Power	148.5					95	
24	Overhead cable	Power	149.7					87	
25	Troy-Menands bridge	Highway	150.2			317		61	Note 5.
27	Troy-Watervliet bridge	Highway	152.1			250		55	Fixed.
28	Troy-Green Island Bridge	Highway & Railroad	152.7			167		24	Vertical lift. Being removed 1978.
29	Troy-Green Island Bridge	Highway	152.7			184		29	Vertical lift. Under construction 1979. Notes 4 and 7.
30	Troy-Green Island-Hoosick St. bridge	Highway	153.1	145	200			60	Fixed. Under construction 1978.
	Troy Lock		153.9						
31	Troy-Cohoes-112th St. bridge	Highway	155.4			175	33		Bascule. Notes 4 and 6.

Note 1.–The bridge has a center clearance of 213 feet, with a clearance of 210 feet at the W end of the span and 195 feet at the E end of the span.

Note 2.–The bridge has a center clearance of 181 feet, with a clearance of 150 feet for a center width of 760 feet.

Note 3.–Clearance is for 750-foot center width.

Note 4.–See **33 CFR 117.1 through 117.59 and 117.791**, chapter 2, for drawbridge regulations.

Note 5.–Vertical lift span maintained in the closed position. See **33 CFR 117.791**, chapter 2, for drawbridge regulations.

Note 6.–Clearance is above maximum navigable pool level.

Note 7.–The design clearance in the up position is 60 feet.

barge is marked by four vertical lights, one showing fixed white and three showing fixed red.

Charts.–The National Ocean Service provides chart coverage of the New York State Barge Canal System as far W as Lyons, N.Y. Coverage of the canal system from Lyons W to the Niagara River at

Tonawanda, N.Y., is contained in The Grand Canal, Cruise'n Chart No. 2, available from New York State Office of Parks, Recreation, and Historic Preservation, Agency Building No. 1, Empire State Plaza, Albany, N.Y. 12238. In October 1985, Cruise'n Chart No. 2 was temporarily not available.

Channels.–The **Great Lakes-Hudson River Waterway Improvement** is that part of the barge canal system including the Erie Canal from Waterford W to Three Rivers and thence the Oswego Canal to Lake Ontario. This section of the system, funded by the U.S. Government and maintained by the State of New York, has a project depth of 14 feet at normal pool level between locks and 13 feet at normal pool level through all locks and guard gates. These channels have widths of 104 feet in earth cuts, 120 feet in rock cuts, and 200 feet in river and lake sections.

Elsewhere in the New York State Barge Canal System, the project depth is 12 feet in all channels and through all locks and guard gates. These channels have widths of 75 feet in earth cuts, 94 feet in rock cuts, and generally 200 feet in canalized rivers.

The barge canal system is well marked by lights, lighted ranges, lighted and unlighted buoys, and daybeacons, all maintained by the State of New York. The arrangement of aids considers the entire canal system as a waterway extending from the Hudson River to interior parts of the State. All red lights, daybeacons, and buoys are on the right or starboard hand, and all white lights, daybeacons, and buoys are on the left or port hand when proceeding up or away from the Hudson River, or away from the main line in the branches. This arrangement extends W to Tonawanda on the Niagara River. However, buoyage in the Niagara River is based on the principle that "proceeding from seaward" is proceeding from Lake Erie toward the Niagara Falls. Mariners are therefore reminded, after exit from the barge canal into the Niagara River, to keep red buoys to port and green buoys to starboard when continuing on to Lake Erie.

Locks.–The New York State Barge Canal System has a total of 56 locks plus the Federal lock at Troy. The controlling dimensions of the locks are a length of 300 feet and a width of 43.5 feet. The locks and guard gates have a depth of 12 feet over the sills at normal pool level, except 13 feet over the sills in the Great Lakes-Hudson River Waterway Improvement. The lock lifts range from 6 feet to 40.5 feet, with an average lift of 17.7 feet. The guard gates at various points in the canal system have a pier in midchannel with a clear passage of 55 feet on either side.

Bridges.–The barge canal system is crossed by a total of 302 bridges, 28 on Champlain Canal, 69 on Erie Canal W to Three Rivers, 11 on Oswego Canal, 179 on Erie Canal from Three Rivers to Tonawanda, and 17 on Cayuga and Seneca Canal. Most of the bridges are fixed, except where local conditions necessitate other types. The least vertical clearance for bridges crossing the part of the system known as the Great Lakes-Hudson River Waterway Improvement is 20 feet, and the least clearance for all other parts of the canal system is 15.5 feet.

Regulations.–A **speed limit** of 6 mph is enforced in the barge canal, except in the canalized rivers and lakes. In the canalized rivers and lakes, the speed limit is dependent on traffic conditions, and speed limits for the various sections are posted at each lock. Copies of the canal regulations and detailed information regarding movement through the canal are available from the Office of the Director, Waterways Maintenance Subdivision, New York State Department of Transportation, State Campus, Building 5, 1220 Washington Avenue, Albany, N.Y. 12232; telephone, 518-457-4420.

Small-craft facilities.–Marinas providing all types of small craft services and supplies are located throughout the barge canal system. A list of sewage pump-out facilities in New York State is available from the New York State Department of Environmental Conservation, 50 Wolf Road, Albany, N.Y. 12205.

Storm warning signals are displayed at Sylvan Beach at the E end of Oneida Lake and at Brewerton at the W end of Oneida Lake.

Charts 14784, 14783, 14782, 14781.–Lake Champlain extends from the upper end of Champlain Canal at Whitehall, N.Y., N for about 112 miles to the International boundary at Rouses Point, N.Y. The N end of the lake outlets N through Riviere Richelieu and Canal de Chambly to the St. Lawrence River.

The principal ports on the lake are Port Henry, N.Y., at the S end, Burlington, Vt., and Plattsburgh, N.Y., near midlake, and Rouses Point, N.Y., at the N end. The lake is used extensively by pleasure craft, and marinas are found on both sides throughout its length.

Chart datum.–The plane of reference for depths shown on the charts covering Lake Champlain is low lake level, which is 93.0 feet above mean sea level.

Channels.–The S 37 miles of Lake Champlain, from Whitehall N to **Crown Point** (44°01.8'N., 73°25.8'W.), is a narrow arm. The S 13 miles of this arm, from Whitehall N to **Benson Landing,** is filled with a marshy flat traversed by a narrow channel of open water. A Federal project provides for a 12-foot channel through this reach. In 1979, the centerline controlling depth in the reach was 11 feet. Above Benson Landing, natural deep water is available to Crown Point. The entire narrows, from Whitehall to Crown Point is well marked by lights and buoys.

N from Crown Point for about 75 miles to Rouses Point, Lake Champlain is deep and wide. Prominent points and shoals throughout the lake are marked by lights and buoys.

Fluctuations of water level.–The water level of Lake Champlain is subject to variation from year to year; the observed range is from 0.6 foot below to 8.8 feet above the reference plane of low lake level. During each year, the seasonal fluctuation is 4 to 5 feet, the lowest stage occurring in September or October and the highest stage in April or May.

Following is a description of the principal ports and tributaries of Lake Champlain.

Chart 14784.–Poultney River, not navigable, flows into the E side of Lake Champlain about 1 mile N of Whitehall. The **State boundary** between New York and Vermont follows Lake Champlain from the mouth of Poultney River N to the International boundary.

Marinas in the stretch from Whitehall to Port Henry are at **Chipman Point** 19 miles N of Whitehall, 1.5 miles N of Chipman Point, and at the mouth of **Hospital Creek** opposite Port Henry. The usual services and travelifts to 20 tons are available.

La Chute is a creek that flows into the W side of the lake about 22 miles N of Whitehall. The approach to the creek is very shoal and weedy and is not recommended for other than small outboards, which can then navigate the creek for about 1 mile during high stages. **Fort Ticonderoga,** on the point E of the creek mouth, is prominent from the lake.

Cable ferry.–Fort Ticonderoga Ferry crosses the lake about 1.7 miles above La Chute. The ferry barge is towed by a tug and guided across the lake by two cables which are fixed on either shore. Passing through guides and carrier wheels on the ferry, the cables are dropped to the bottom astern and picked up ahead. The cables reach the bottom about 400 feet from either end of the ferry thus allowing vessels to pass by the moving ferry. The tug and barge are marked by lights, and signs on both and along the shore warn vessels of the presence of the ferry and the cables. **Extreme caution**

Structures across Lake Champlain

**Miles from Whitehall*

***Clear width in feet proceeding away from Whitehall*

No.	*Location and Name*	*Kind*	*Miles**	*Clear width in feet of draw or span openings***			*Clear height in feet above water datum*		*Remarks*
				Right	*Left*	*Center*	*Low*	*High*	
1	Overhead cable	Power	0.3						Data not available.
2	Overhead cable	Power	1.0						Data not available.
3	South Bay-Delaware & Hudson Ry. bridge	Railroad	2.5	89	89	96	11		Fixed.
4	South Bay-Overhead cable	Power	3.0						Data not available.
5	South Bay-Overhead cable		3.1				9		
6	South Bay-State Route 22 bridge	Highway	3.2						Fixed. Data not available.
7	Crown Point-Chimney Point bridge	Highway	36.7			186	91		Fixed. Note 1.
8	Colchester Point-South Hero Island bridge		78.1			177			Swing span and center pier removed.
9	Overhead cable		82.4				45		
10	Sand Bar Bridge	Highway	82.6			54	15		Fixed.
11	South Hero-North Hero Islands bridge		90.1			158			Swing span and center pier removed.
12	South Hero-North Hero Islands (U.S. 2) bridge	Highway	91.8			80	18		Bascule. Note 2.
13	Pelots Point-Alburg Tongue bridge		95.7			154			Swing span and center pier removed.
14	North Hero Island-Alburg Tongue (South Alburg) bridge	Highway	99.2			70	25		Fixed.
15	Overhead cables		99.3				47		
16	Isle La Motte-Alburg Tongue bridge	Highway	99.4			30	8		Fixed.
17	Missisquoi Bay-Central Vermont Ry. bridge	Railroad	105.6			36	11		Swing. Note 2.
18	Overhead cables	Power	105.9				50		
19	Missisquoi Bay-East Alburg (State Route 78) bridge	Highway	105.9			45	18		Bascule. Note 2.
20	Rouses Point bridge		106.6			197			Swing span and center pier removed. Note 1.
21	Rouses Point bridge	Highway	106.9	126	126		22		Swing. Note 1.

Note 1.–Bridge is across the direct route through the lake proceeding from the Hudson River to the St. Lawrence River.
Note 2.–See 33 CFR 117.1 through 117.59, 117.797, and 117.993, chapter 2, for drawbridge regulations.

is advised when passing the cable ferry. The ferry should never be passed closeby.

A **special anchorage** is on the W side of the lake just S of the ferry crossing. (See **33 CFR 110.1 and 110.8(a)**, chapter 2, for limits and regulations.)

Port Henry, N.Y., is on the W side of Lake Champlain at the S end of the wide section, about 39 miles N of Whitehall.

Channels.–A dredged basin along the harbor front is entered from S. The E side of the entrance is marked by a buoy that marks the S end of the shoals that border the E side of the basin. At the N end of the harbor, a 500-foot pier of the New York State Barge Canal System extends SE from shore and is marked at the outer end by a private light. The pier also serves as a breakwater to protect the harbor from N. A State-dredged channel leads from deep water W to the terminal. In 1967, the maximum depth available in the harbor basin and barge canal terminal channel was 12 feet.

Small-craft facilities.–A marina at Port Henry provides gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. A 15-ton marine railway can handle 50-foot craft for hull and engine repairs. In 1977, depths of 4 to 10 feet were reported alongside the berths.

Bulwagga Bay, S of Port Henry on the W side of Crown Point, is foul with submerged piles and cribs. A line of submerged piles that extends from the E side across the mouth of the bay is marked by private buoys.

Chart 14783.–Between **Barber Point** (44°09.2'N., 73°24.3'W.) and **The Four Brothers** 20 miles N, marinas are on the W side of the lake at **Westport,** N.Y., and **Essex, N.Y.,** and on the E side of the lake on the S side of **Thompsons Point** and in **McNeil Cove.** Marine railways to 50 tons, lifts to 35 tons, and the usual services are available.

A **special anchorage** is at Essex, N.Y. (See **33 CFR 110.1 and 110.8(b)**, chapter 2, for limits and regulations.)

Otter Creek flows into the E side of the lake about 6.5 miles NE of Barber Point. A depth of about 6 feet can be carried by small craft for 8 miles to **Vergennes, Vt.**

Boquet (Bouquet) River, 3 miles N of Essex, is navigable by small motorboats for about 1 mile during high water stages.

Charts 14783, 14782.–Willsboro Bay, on the W side of the lake W of The Four Brothers, is enclosed on the E by **Willsboro Point.** Marinas on the E side of the bay provide transient berths, gasoline, diesel fuel, electricity, ice, sewage pump-out, mast-stepping service, launching ramps, and hull and engine repairs.

Shelburne Bay, E of The Four Brothers, is enclosed on the W by **Shelburne Point.** Two special anchorages are on the W side of the bay. (See **33 CFR 110.1 and 110.8(c) and (c-1)**, chapter 2, for limits and regulations.) A boatyard on the W side of the bay provides transient berths, gasoline, diesel fuel, water, ice, electricity, and sewage pump-out. A 220-foot marine railway and a 30-ton lift are available for hull and engine repairs.

Charts 14782, 14785.–Burlington, Vt., just N of the entrance to Shelburne Bay, is the largest port on Lake Champlain. Several companies have dock facilities for receipt of petroleum products by barge. The Radisson Hotel, with a red lighted sign, is the most prominent object in the harbor approach.

Burlington Breakwater North Light (44°28.8'N., 73°13.8'W.), 35 feet above the water, is shown from a red skeleton tower adjoining a small white house on the N end of the N breakwater; a fog signal is at the light.

Channels.–Two detached breakwaters parallel the shore and protect the harbor front from W. A light with a fog signal marks the N end of the N breakwater, a light marks the S end of the S breakwater, and a daybeacon marks the N side of the gap between them. Depths in the harbor are 6 to 12 feet off the wharves increasing to much greater depths at the breakwaters. Good anchorage is available behind the breakwaters.

Burlington Coast Guard Station is at the N end of the harbor, E of Burlington Breakwater North Light. **Storm warning signals are displayed.** (See chart.)

Harbor regulations are established by the Burlington City Council and are enforced by the **harbormaster** who may be reached at City Hall. A **speed limit** of 5 mph is enforced in the city yacht basin. Copies of the regulations may be obtained from the Mayor, City Hall, Burlington Vt. 05401.

Foreign-Trade Zone No. 55 and Subzone No. 55A are in Burlington. (See chapter 1, Foreign-Trade Zones, and appendix for addresses.)

Small-craft facilities.–Marinas in the city yacht basin 0.6 mile SE of Burlington Breakwater North Light provide transient berths, gasoline, diesel fuel, water, ice, electricity, and a launching ramp.

Ferry.–Passenger and automobile ferries operate seasonally between Burlington and Port Kent, N.Y., 10 miles WNW.

Caution.–An operations area for amphibious and air rescue training is in midlake W of Burlington, bounded generally by Schuyler Reef, Appletree Shoal, Juniper Island, and The Four Brothers. The using agency is Plattsburgh Air Force Base.

Chart 14782.–From Willsboro Bay N to Plattsburgh, N.Y., marinas are at **Port Kent, N.Y.,** 4.5 miles N of Port Kent, and W of **Valcour Island.** The usual small-craft facilities are available.

Winooski River, 4 miles NNW of Burlington, is navigable by small motorboats.

Malletts Bay, 6 miles N of Burlington, is a nearly landlocked bay protected on the W by **Malletts Head.** About 3.5 miles W of Malletts Head, in the approach to the bay from the open lake, an abandoned railroad dike extends from the mainland shore N to the S end of Grand Isle near midlake. A narrow gap near the N end of the dike, marked on either side by a private light, provides access for small craft. A shifting bar at the gap has depths of as little as 3 feet. A 1-foot spot just inside the gap is marked by a buoy. **Special anchorages** are on the W side of Malletts Bay. (See **33 CFR 110.1 and 110.8(d) and (e)**, chapter 2, for limits and regulations.) Marinas in Malletts Bay provide transient berths, gasoline, diesel fuel by truck, water, ice, electricity, sewage pump-out, marine supplies, and launching ramps. Lifts to 20 tons are available for hull and engine repairs.

Plattsburgh, N.Y., is on the W side of **Cumberland Bay,** 20 miles NW of Burlington. Several companies receive petroleum products by barge at the town.

Channels.–The dredged basin along the city waterfront is protected from the E by a detached breakwater paralleling the shore. The ends of the breakwater are marked by lights. The controlling depths are 5 to 9 feet at the wharves increasing to 12 feet at the breakwater. The protected area of the harbor provides good anchorage. A seasonally deployed floating breakwater is close S of the wharves on the W side of the basin.

Wharf.–A terminal of the New York State Barge Canal System is in the NW corner of Cumberland Bay. The wharf has a 400-foot S face with a reported depth of 12 feet alongside. The approach to the wharf is marked by a buoy and a private **322°** lighted range.

Foreign-Trade Zone No. 54 is in Plattsburg. (See chapter 1, Foreign-Trade Zones, and appendix for address.)

Small-craft facilities.–A marina at Plattsburgh provides transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, marine supplies, and a launching ramp. A 20-ton lift is available for hull and engine repairs.

Ferry.–A ferry operates from the E side of **Cumberland Head,** which encloses the E side of Cumberland Bay, to the W side of Grand Isle.

Charts 14782, 14781.–**Grand Isle** or **South Hero Island, North Hero Island,** and **Alburg Tongue** divide the N part of Lake Champlain into two arms. **Missisquoi Bay** is at the N end of the E arm, and Riviere Richelieu flows N from the W arm.

Lamoille River, 2.8 miles N of Mallets Bay, is navigable at low stages only by motorboats drawing 1 to 2 feet. The channel through the fixed span of the bridge that connects the S end of Grand Isle with the mainland had a reported controlling depth of less than 2 feet in 1977. **Missisquoi River,** flowing into the S side of Missisquoi Bay, is navigable at low stages by motorboats drawing 1 to 2 feet for about 6 miles to Swanton. **Dead Creek,** the alternate entrance to the river, has depths of 2 to 12 feet.

Marinas are in the E arm of the N end of Lake Champlain on the SE side of Grand Isle, at the NE end of **Burton Island** on the W side of **St. Albans Bay,** in **City Bay** on the E side of North Hero Island, and on the E side of **Alburg Passage.** Lifts handling boats to 25 feet are available.

A **special anchorage** is at the head of St. Albans Bay. (See **33 CFR 110.1 and 110.8(f)**, chapter 2, for limits and regulations.)

Great Chazy River flows into the W side of Lake Champlain about 4 miles S of Rouses Point, N.Y. The entrance to the river is marked by private lighted and unlighted buoys. The river is navigable at low stages by small boats drawing 2 to 3 feet for about 6 miles to Champlain. In 1979, the entrance channel had a controlling depth of 5 feet. In 1977, 5 feet was reported available to the marina 0.5 mile above the mouth.

Marinas are in **Mooney Bay** (44°47.2'N., 73°22.0'W.) opposite the S end of North Hero Island and 0.5 mile above the mouth of Great Chazy River. Lifts handling boats up to 25 feet are available.

Chart 14781.–**Rouses Point, N.Y.,** is a town and harbor on the W side of the N end of Lake Champlain, just S of the International boundary. The harbor is formed by a bight that extends 2 miles N from **Stony Point.** A detached breakwater, marked at the outer end by a light, extends NE from Stony Point to protect the harbor from S, and a pile railroad trestle protects the harbor from NE.

The harbor has depths of 6 to 8 feet in all seasons of the year, except for depths of 4 feet and less on a reef that extends 0.5 mile S from the point that encloses the N end of the harbor. Anchorage bottom in the harbor is good.

Rouses Point is a **customs port of entry.**

Quarantine, customs, immigration, and agricultural quarantine.–(See chapter 3, Vessel Arrival Inspections, and appendix for addresses.)

Quarantine is enforced in accordance with the regulations of the U.S. Public Health Service. (See Public Health Service, chapter 1.)

Small-craft facilities.–A protected basin is between the railroad trestle and a 500-foot pier just S. The outer 200 feet of the basin has depths of 6 to 8 feet, and the inner part is foul. Marinas at Rouses Point provide transient berths, gasoline, diesel fuel, water, ice, electricity, sewage pump-out, and some marine supplies. A 10-ton mobile lift is available for hull and engine repairs.

The **International boundary** between the United States and Canada is on a general E and W line about 2.7 miles N of Stony Point.

Charts 14781, *1326, *1325.–**Riviere Richelieu** flows N from the head of Lake Champlain at Rouses Point for about 80 miles to its mouth at the St. Lawrence River at the city of **Sorel, Que.,** about 46 miles below Montreal. The size of vessels able to navigate the river is controlled by the size of the locks in Canal de Chambly. The minimum overhead clearance is 29 feet, under a bridge across Canal de Chambly.

Canal de Chambly, entered about 22 miles N of the International boundary, is about 11.5 miles long and overcomes the rapids of Riviere Richelieu between Saint-Jean and Chambly. The canal has eight locks and one guard lock, with a total lift of 80 feet. The smallest lock in the canal has a usable length of 111.4

feet and width of 23.2 feet, with 6½ feet over the sills. The canal has a minimum width of 36 feet at the bottom and 60 feet at the surface.

At St-Ours, Que., 32 miles below Chambly and 14 miles above Sorel, the river is divided into two channels around a small island. The W channel is closed by a dam. A lock in the E channel has a usable length of 311 feet and width of 45 feet, with 12 feet over the sills. The lock has a lift of 5 feet.

From St-Ours to the mouth of the river at Sorel, the limiting depth in the river is 12 feet. In February 1983, shoaling to 8½ feet was reported in sections of this reach.

Vessels navigating Canal de Chambly and the lock canal at St-Ours are required to carry a permit for which a toll is charged and are subject to the Canal Regulations contained in a booklet available from the Canadian Government Publishing Centre. The canals are under the jurisdiction of Parks Canada. (See appendix for addresses.)

Riviere Richelieu and Canal de Chambly are fully described in Canadian Sailing Directions, Gulf and River St. Lawrence, published by the Canadian Hydrographic Service and sold by the Hydrographic Chart Distribution Office. (See appendix for addresses.)

APPENDIX

Sales Information.–National Ocean Service publications and nautical charts are sold by NOS and its authorized sales agents in many ports of the United States and in some foreign ports. Mail orders should be addressed to National Ocean Service, Distribution Branch (N/CG33), 6501 Lafayette Avenue, Riverdale, Md. 20737, and accompanied by a check or money order payable to NOS, Department of Commerce. Remittance from outside the U.S. should be made either by an International Money Order or by a check payable on a U.S. bank. Chart catalogs, which include a listing of authorized sales agents, are free upon request. The National Ocean Service maintains over-the-counter cash sales offices at 6501 Lafayette Avenue, Riverdale, Md. 20737; at 6001 Executive Boulevard, Rockville, Md. 20852 (small orders only); at 439 West York Street, Norfolk, Va. 23510; at 1801 Fairview Avenue East, Seattle, Wash. 98102; and at 701 C Street, Box 38, Room F106, Anchorage, Alaska 99513.

National Ocean Service Offices

District of Columbia (Headquarters): Assistant Administrator, National Ocean Service, National Oceanic and Atmospheric Administration, Herbert C. Hoover Bldg., Room 5805, Washington, D.C. 20230.

Rockville: Director, Office of Charting and Geodetic Services, National Ocean Service, National Oceanic and Atmospheric Administration, 6001 Executive Boulevard, Rockville, Md. 20852.

Norfolk: Director, Atlantic Marine Center, NOS, National Oceanic and Atmospheric Administration, 439 West York Street, Norfolk, Va. 23510.

Seattle: Director, Pacific Marine Center, NOS, National Oceanic and Atmospheric Administration, 1801 Fairview Avenue East, Seattle, Wash. 98102.

Charts and Publications–National Ocean Service

Nautical Charts (See Chart Catalogs)

United States Coastal and Intracoastal waters, and possessions.

Great Lakes, Lake Champlain, New York State Canals, and the St. Lawrence River-St. Regis to Cornwall, Canada.

Publications (See Chart Catalogs for latest editions and prices)

Coast Pilots

U.S. Coast Pilot 1, Atlantic Coast, Eastport to Cape Cod.

U.S. Coast Pilot 2, Atlantic Coast, Cape Cod to Sandy Hook.

U.S. Coast Pilot 3, Atlantic Coast, Sandy Hook to Cape Henry.

U.S. Coast Pilot 4, Atlantic Coast, Cape Henry to Key West.

U.S. Coast Pilot 5, Atlantic Coast-Gulf of Mexico, Puerto Rico, and Virgin Islands.

U.S. Coast Pilot 6, Great Lakes, Lakes Ontario, Erie, Huron, Michigan, and Superior, and St. Lawrence River.

U.S. Coast Pilot 7, Pacific Coast, California, Oregon, Washington, and Hawaii.

U.S. Coast Pilot 8, Pacific Coast Alaska, Dixon Entrance to Cape Spencer.

U.S. Coast Pilot 9, Pacific and Arctic Coasts, Alaska-Cape Spencer to Beaufort Sea.

Distance Tables

Distances Between United States Ports, Sixth (1978) Edition.

Water Levels

Great Lakes Water Levels, (year): Daily and Monthly Average Water Surface Elevations, published annually.

Great Lakes Water Levels: Monthly and Annual Average Water Surface Elevations, 1860-1975, published every 5 years.

Hydrograph of Lake Levels, a hydrograph of monthly mean levels of the Great Lakes from 1860 to date and of Lake St. Clair from 1898 to date.

Charts and Publications–Other U.S. Government Agencies

A partial list of publications and charts considered of navigational value is included for the ready reference of the mariner. In addition to the agents located in the principal seaports handling publication sales, certain libraries have been designated by the Congress of the United States to receive the publications as issued for public review.

Nautical Charts

U.S. Waters:

Apalachicola, Chattahoochee and Flint Rivers Navigation Charts, Alabama River Charts, and Black Warrior-Tombigbee Rivers River Charts: Published and for sale by U.S. Army Engineer District Mobile, P.O. Box 2288, 109 St. Joseph Street, Mobile, Ala. 36628.

Flood Control and Navigation Maps of the Mississippi River, Cairo, Ill. to the Gulf of Mexico: Published by Mississippi River Commission and for sale by U.S. Army Engineer District Vicksburg, P.O. Box 60, U.S. Post Office and Courthouse, Vicksburg, Miss. 39180.

Upper Mississippi River Navigation Charts (Mississippi River Cairo, Ill. to Minneapolis, Minn.): Published by U.S. Army Engineer North Central Division and for sale by U.S. Army Engineer District St. Louis, 210 N. Tucker Boulevard, St. Louis, Mo. 63101.

Charts of the Illinois Waterway, from Mississippi River at Grafton, Ill. to Lake Michigan at Chicago and Calumet Harbors: Published and for sale by U.S.

Army Engineer District Rock Island, Clock Tower Bldg., Rock Island, Ill. 61201.

Foreign Waters: Published by Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC); for sale by Defense Mapping Agency Office of Distribution Services, Washington, D.C. 20315, and its sales agents.

Marine Weather Services Charts: Published by the National Weather Service; for sale by NOS Distribution Branch (N/CG33), 6501 Lafayette Avenue, Riverdale, Md. 20737.

Publications

Water Levels

Monthly Bulletin of Lakes Levels for the Great Lakes, showing current level of the Great Lakes and Lake St. Clair, levels of the prior 12 to 23 months, and probable levels of the next 6 months: Published by and available without charge from the Department of the Army, Detroit District, Corps of Engineers, P.O. Box 1027, Detroit, Mich. 48231.

Great Lakes and Connecting Channels Water Levels and Depths, a twice monthly bulletin that provides forecast channel depths of the Great Lakes for navigation purposes: Published by and available without charge from the Department of the Army, Detroit District, Corps of Engineers, P.O. Box 1027, Detroit, Mich. 48231.

Sailing Directions (Foreign Countries): Published by Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC); for sale by Defense Mapping Agency Office of Distribution Services, Washington, D.C. 20315, and its sales agents.

Notices to Mariners may be obtained free from the following: Local Notices to Mariners–District Commander of the local Coast Guard district; Weekly Notice to Mariners, coasts of the United States, Possessions, and foreign–Defense Mapping Agency Office of Distribution Services; Local Notice to Mariners, Great Lakes–Commander, Ninth Coast Guard District, Cleveland, Ohio.

Special Notice to Mariners are published annually in Notice to Mariners 1. These notices contain important information of considerable interest to all mariners. Interested parties are advised to read these notices.

Light Lists (United States and Possessions): Published by U.S. Coast Guard; for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Light Lists (Foreign Countries): Published by Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC); for sale by Defense Mapping Agency Office of Distribution Services, Washington, D.C. 20315, and its sales agents.

Radio Navigational Aids, Atlantic and Mediterranean Area (Pub. 117A), Pacific and Indian Oceans Area (Pub. 117B): Published by Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC); for sale by Defense Mapping Agency, Office of Distribution Services, Washington, D.C. 20315, and its sales agents.

Selected Worldwide Marine Weather Broadcasts: Published by the National Weather Service; for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

The Nautical Almanac, The **Air Almanac,** and **Astronomical Almanac:** Published by the Naval Observatory; for sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

American Practical Navigator (Bowditch) (Pub. No. 9) and **International Code of Signals** (Pub. No. 102): published by the Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC); for sale by Defense Mapping Agency Office of Distribution Services, Washington, D.C., and its sales agents.

Navigation Rules; Navigation Rules, International-Inland (COMDTINST M16672.2): Published by the U.S. Coast Guard; for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Port Series of the United States: Published and sold by Corps of Engineers, U.S. Army, Water Resources Support Center, Port Facilities Branch, Casey Building, Fort Belvoir, Va. 22060.

Official U.S. **Coast Guard Recreational Boating Guide** (CG-340): Published by U.S. Coast Guard; for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Marine Radiotelephone Users Handbook: Published and sold by Radio Technical Commission for Maritime Services, P.O. Box 19087, Washington, D.C. 20036.

U.S. Government Agencies

Corps of Engineers Offices

District office addresses and areas of jurisdiction covered by this Coast Pilot:

Buffalo District: 1776 Niagara Street, Buffalo, N.Y. 14207. The U.S. waters and tributary waterways of St. Lawrence River from the New York State-Canadian boundary to the head of the river, Lake Ontario from St. Lawrence River to the mouth of Niagara River, Niagara River, and Lake Erie from the head of Niagara River to the Ohio-Michigan boundary.

Chicago District: 219 South Dearborn Street, Chicago, Ill. 60604. The S end of Lake Michigan and its tributary waterways from and including Michigan City, Indiana, to the Illinois-Wisconsin boundary; including Calumet River lakeward of the East 130th Street bridge.

Detroit District: Patrick V. McNamara Bldg., 477 Michigan Avenue, Detroit, Mich. 48226. Lakeshore areas and tributary waters of the States of Michigan, Wisconsin, and Minnesota.

New York District: 26 Federal Plaza, New York, N.Y. 10278. Hudson River, Lake Champlain and its tributary waterways, and the Great Lakes-Hudson River Waterway Improvement.

Rock Island District: Clock Tower Bldg., Rock Island, Ill. 61204-2004. Calumet River upstream of the East 130th Street bridge, Little Calumet River, Calumet Sag Channel, Lockport Lock and Dam, Des Plaines River below its confluence with the Chicago Sanitary and Ship Canal, and Illinois River from its head at Des Plaines River to the new La Grange Lock and Dam.

St. Louis District: 210 North Tucker Boulevard, St. Louis, Mo. 63101. Illinois River from the new La Grange Lock and Dam to its confluence with Mississippi River.

Environmental Protection Agency (EPA) Offices.–Regional offices and States in the EPA coastal regions and Great Lakes:

Region I (New Hampshire, Maine, Massachusetts, Connecticut, Rhode Island, Vermont): J. F. Kennedy Federal Bldg., Room 2203, Boston, Mass. 02203.

Region II (New Jersey, New York, Puerto Rico, Virgin Islands): 26 Federal Plaza, Room 900, New York, N.Y. 10278.

Region III (Delaware, Maryland, Virginia, District of Columbia, Pennsylvania): 841 Chestnut Street, Philadelphia, Pa. 19107. Streets, Philadelphia, Pa. 19106.

Region V (Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin): 230 South Dearborn Street, Chicago, Ill. 60604.

Coast Guard District Offices

Commander, Second Coast Guard District, 1430 Olive Street, St. Louis, Missouri 63103. Arkansas, West Virginia, Kentucky, Tennessee, Oklahoma, Kansas, Nebraska, North Dakota, South Dakota, Wyoming, Colorado, Iowa, and Missouri; that part of Pennsylvania S of 14°N., and W of 79°W.; those parts of Ohio and Indiana S of 41°N.; Illinois, except that part N of 41°N. and E of 90°W.; that part of Wisconsin S of 46°20′N., and W of 90°W.; that part of Minnesota S of 46°20′N.; that part of Alabama N of 34°N.; that part of Mississippi N of the S boundaries of the counties of Washington, Sunflower, Leflore, Grenada, Calhoun, Chickasaw, Lee, Prentiss, and Tishomingo Counties, except that portion of the Tennessee-Tombigbee Waterway S of the Bay Springs Lock and Dam.

Commander, Third Coast Guard District, Governors Island, New York, N.Y. 10004. In Vermont, the counties of Orleans, Franklin, Grand Isle, Chittenden, Addison, and Rutland; coastal waters and tributaries of Rhode Island from Watch Hill, Connecticut, New York, New Jersey, Pennsylvania, and Delaware, including Fenwick Island Light, but not including that portion of Delaware containing the reaches of the Nanticoke River and the Chesapeake and Delaware Canal.

Commander, Ninth Coast Guard District, 1240 East 9th Street, Cleveland, Ohio 44199. Michigan, New York N of 42°N. and W of 74°39′W.; Pennsylvania N of 41°N. and W of 78°55′W.; that part of Ohio and Indiana N of 41°N.; that part of Illinois N of 41°N. and E of 90°W.; Wisconsin, except that part S of 46°20′N. and W of 90°W.; and that part of Minnesota N of 46°20′N.

Note: A Marine Safety Office combines the functions of the Captain of the Port and Marine Inspection Office.

The symbol (D) preceding an office indicates that a Documentation Office is at the same address.

Coast Guard Marine Safety Offices

Buffalo, N.Y.: Federal Bldg., Room 1111, 111 W. Huron Street 14202.

Toledo, Ohio: Federal Bldg., Room 501, 234 Summit Street 43604.

Cleveland, Ohio: 1055 East Ninth Street 44114.

Detroit, Mich.: 2660 East Atwater Street 48207.

Chicago, Ill.: 610 South Canal Street 60607.

Milwaukee, Wis.: 2420 S. Lincoln Memorial Drive 53207.

Duluth, Minn.: Canal Park 55802.

Coast Guard Captains of the Port

Muskegon, Mich.: Fulton Avenue and Bluff Street 49441.

Sault Ste. Marie, Mich.: c/o U.S. Coast Guard Group 49783.

Coast Guard Marine Inspection Offices

St. Ignace, Mich.: Municipal Bldg. 49781.

Sturgeon Bay, Wis.: 360 Louisiana Street 54235.

Coast Guard Documentation Offices

Cleveland, Ohio: 601 Rockwall Ave. 44114.

Coast Guard Stations.–The stations listed are in the area covered by this Coast Pilot. They have search and rescue capabilities and may provide lookout, communications, and/or patrol functions to assist vessels in distress. The National VHF-FM Distress System provides continuous coastal radio coverage outwards to 20 miles on channel 16 (156.80 MHz). After contact on channel 16, communications with the Coast Guard should be on channel 22 (157.10 MHz). If channel 22 is not available to the mariner, communications may be made on channel 12 (156.60 MHz). Selected stations guard the International Radiotelephone Distress, Safety and Calling Frequencies.

St. Lawrence River:

Alexandria Bay, N.Y. (44°19.9′N., 75°56.1′W.). On the S shore of Wellesley Island, 1,400 feet W of Light 195 on Cherry Island.

Lake Ontario:

Sackets Harbor, N.Y. (43°56.9′N., 76°07.3′W.). On the S side of the harbor, about 800 feet S of Navy Point Light. (Seasonal; no continuous radio guard.)

Oswego, N.Y. (43°27.8′N., 76°31.0′W.). On S side of basin about 0.7 mile S of West Pierhead Light.

Sodus Bay, N.Y., Sodus Point Station (43°16.4′N., 76°58.5′W.). On W side of harbor entrance. (Seasonal; no continuous radio guard.)

Rochester, N.Y. (43°15.4′N., 77°36.2′W.). E side of entrance to harbor.

Youngstown, N.Y., Niagara Station (43°15.7′N., 79°03.8′W.). E side of entrance to Niagara River.

Lake Erie:

Buffalo, N.Y., (42°52.6′ N., 78°53.2′ W.). On the S pier at the mouth of Buffalo River.

Erie, Pa. (42°09.2′ N., 80°04.7′ W.). On the N side of the entrance channel, near Erie Harbor Inner Range Rear Light.

Ashtabula, Ohio (41°54.1′ N., 80°47.9′ W.). On E side of river, about 700 feet N of the highway bridge.

Fairport, Ohio (41°45.6′ N., 81°16.9′ W.). On W side of mouth of Grand River.

Cleveland, Ohio (41°30.6′ N., 81°41.6′ W.). Near the W end of Burke Lakefront Airport on the S side of a small basin 1.1 miles E of East Breakwater Light.

Lorain, Ohio (41°28.2′ N., 82°10.7′ W.). E side of mouth of Black River.

Marblehead, Ohio (41°32.6′ N., 82°43.8′ W.). On Point Marblehead, 1.1 miles 297° from Marblehead Light.

Toledo, Ohio (41°41.6′ N., 83°28.4′ W.). In Bay View Park, on NW side of the Maumee River near its mouth.

Detroit River:

Detroit, Mich., Belle Isle Station (42°20.4′ N., 82°57.7′ W.). At Belle Isle Light near the upper end of the island.

Lake St. Clair:

St. Clair Shores, Mich. (42°28.4′ N., 82°52.8′ W.). Near the end of Revere Avenue about 0.7 mile N of Miller Memorial Light.

Selfridge Air National Guard Base, Mich., Detroit Air Station (42°36.5′ N., 82°50.5′ W.). W of Anchor Bay, about 3.5 miles WNW of Clinton River entrance.

St. Clair River:

St. Clair Flats, Mich. (42°33.1′ N., 82°39.0′ W.). On NW side of river at front light of St. Clair Flats Canal Range.

Port Huron, Mich. (43°00.3′ N., 82°25.3′ W.). On W side of entrance to St. Clair River, near Fort Gratiot Light.

Lake Huron:

Harbor Beach, Mich. (43°51.0′ N., 82°38.6′ W.). At the outer end of a causeway and trestle extending E from shore, about 0.7 mile WNW of Harbor Beach Light. (Seasonal; no continuous radio guard.)

Saginaw River, Mich. (43°37.7′N., 83°50.3′W.). On E side of Saginaw River about 1.7 miles above the river entrance.

East Tawas, Mich. (44°15.5′ N., 83°26.2′ W.). On Tawas Point, about 0.6 mile NE of Tawas Light.

St. Ignace, Mich. (45°51.3′ N., 84°42.2′ W.). Near Michigan Department of State Highways dock on E end of Graham Point.

Lake Michigan:

Charlevoix Mich. (45°19.0′N., 85°14.7′W.). N side of Pine River entrance to Lake Charlevoix.

Traverse City, Mich., Air Station (44°44.7′N., 85°34.9′W.). At SE corporate limits of the city, about 2.5 miles SE of Duncan L. Clinch Yacht Harbor.

Frankfort, Mich. (44°37.8′N., 86°14.6′W.). N side of entrance to harbor.

Manistee, Mich. (44°15.0′N., 86°20.4′W.). N side of entrance to Manistee Harbor. (Seasonal station.)

Ludington, Mich. (43°57.2′N., 86°27.6′W.). N side of entrance to harbor.

Muskegon, Mich. (43°13.7′N., 86°20.3′W.). S side of entrance to harbor.

Grand Haven, Mich. (43°03.6′N., 86°14.8′W.). N side of the mouth of the Grand River.

Holland, Mich. (42°46.5′N., 86°12.1′W.). N side of harbor entrance.

South Haven, Mich. (42°24.1′N., 86°17.0′W.). S side of entrance to Black River. (Seasonal, weekends only; no continuous radio guard.)

St. Joseph, Mich. (42°06.8′N., 86°29.1′W.). N side of harbor entrance.

Michigan City, Ind. (41°43.4′N., 86°56.4′W.). E side of entrance to harbor.

Calumet Harbor, Ill. (41°43.0′N., 87°31.6′W.). Lakefront in the S part of Calumet Park, about 1.1 miles S of Calumet River entrance.

Glenview, Ill., Chicago Air Station (42°05.2′N., 87°49.7′W.). About 7.5 miles W of Wilmette Harbor, Ill.

Wilmette, Ill. (42°04.6′N., 87°41.0′W.). N side of harbor entrance.

Kenosha, Wis. (42°35.4′N., 87°49.0′W.). On E side of the inner basin.

Milwaukee, Wis., Coast Guard Station, Group Office, and Base (43°00.1′N., 87°53.2′W.). At S end of outer harbor, about 0.8 mile SW of South Entrance Light.

Sheboygan, Wis. (43°45.0′N., 87°42.3′W.). Near inner end of old N pier stub.

Two Rivers, Wis. (44°08.8′N., 87°33.7′W.). NE side of entrance to harbor.

Sturgeon Bay, Wis. (44°47.7′N., 87°18.7′W.). At E entrance, on N side.

Plum Island, Wis. (45°18.8′N., 86°57.0′W.). On N side of Plum Island. (Seasonal station.)

Green Bay, Wis. (44°32.2′N., 88°00.2′W.). On the E side of the mouth of the Fox River. (Seasonal station.)

St. Marys River:

Sault Ste. Marie, Mich., Coast Guard Station, Group Office, and Base (46°30.0′N., 84°20.3′W.). At Sault Ste. Marie, Mich., about 0.5 mile below the locks.

Lake Superior:

Grand Marais, Mich. (46°40.6′N., 85°58.4′W.). On the W side of harbor entrance channel. (Seasonal, weekends only; no continuous radio guard.)

Munising, Mich. (46°24.9′N., 86°39.7′W.). In the town of Munising at the Munising Range Front Light. (Seasonal, weekends only; no continuous radio guard.)

Marquette, Mich. (46°32.7′N., 87°22.7′W.). Near inner end of breakwater, about 1,000 feet SW of Marquette Light.

Keweenaw Waterway, Mich., Portage Station (47°13.5′N., 88°37.4′W.). On E bank of upper canal about 0.8 mile SE of breakwater entrance.

Bayfield, Wis. (46°48.5′N., 90°48.8′W.). On S side of city, about 1,000 feet SW of Bayfield Harbor South Breakwater Light.

Duluth, Minn. (46°46.3′N., 92°05.4′W.). On Minnesota Point, about 0.5 mile S from Duluth Ship Canal.

Grand Marais, Minn., North Superior Station (47°44.8'N., 90°20.0'W.). At SE side of harbor, about 1,300 feet ENE of Grand Marais Light.

Lake Champlain:

Burlington, Vt. (44°28.8'N., 73°13.5'W.). 1,650 feet E of Burlington Harbor North Breakwater Light, on Battery Park.

Coast Guard Radio Broadcasts.–Urgent, safety, and scheduled marine information broadcasts are made by Coast Guard radio stations. In general, these broadcasts provide information vital to vessels operating in the approaches and coastal waters of the United States including the Great Lakes, Puerto Rico and U.S. Virgin Islands. Types of broadcasts are as follows:

Scheduled broadcasts.–U.S. Coast Guard radio stations make scheduled broadcasts on a prepublished schedule of intervals of 3 hours. After the preliminary announcements on VHF-FM channel 16 (156.80 MHz) the station advises shifting to working frequency: VHF-FM channel 22 (157.10 MHz).

Safety broadcasts.–U.S. Coast Guard stations which make scheduled broadcasts issue safety broadcasts upon receipt and on the next scheduled broadcast. Safety broadcasts are preceded by the safety signal SECURITY. After the preliminary signal on VHF-FM channel 16 (156.80 MHz), the station may announce shifting to working frequency: VHF-FM channel 22 (157.10 MHz).

Urgent broadcasts.–U.S. Coast Guard stations which make scheduled broadcasts issue urgent broadcasts upon receipt and on schedule until canceled. Urgent broadcasts are preceded by the urgent signal, PAN. Both the urgent signal and message may be transmitted on VHF-FM channel 16 (156.80 MHz).

Times of broadcasts.–The following Coast Guard radio stations make scheduled broadcasts at the times indicated; the control station is given, followed by the area of coverage, followed by remote antenna sites.

NMD-35, Alexandria Bay Station, Alexandria Bay (St. Lawrence River). Every 3 hours beginning at 0235 G.m.t.

NMD-47, Buffalo Group, Buffalo (Lakes Erie and Ontario); Oswego, Rochester, Thirtymile Point, Dunkirk, Ashtabula. Every 3 hours beginning at 0255 G.m.t.

NMD-20, Detroit Group, Detroit (Lakes Erie, St. Clair, Huron; Detroit and St. Clair Rivers); Cleveland, Port Huron, Bell Isle, Port Austin, Toledo, Alpena. Every 3 hours beginning at 0135 G.m.t.

NMD-32, Muskegon Group, Muskegon (Lake Michigan); Holland, Frankfort, Ludington. Every 3 hours beginning at 0235 G.m.t.

NMP-9, Milwaukee Group, Milwaukee (Lake Michigan); Sturgeon Bay, Two Rivers, Chicago, Milwaukee. Every 3 hours beginning at 0255 G.m.t.

NOG, Sault Ste. Marie Group, Sault Ste. Marie (Lakes Huron, Michigan and E. Lake Superior); Goetzville (46°04'N., 84°06'W.), Sault Ste. Marie, Beaver Island, Grand Marais, Escanaba, Marquette. Every 3 hours beginning at 0005 G.m.t.

NOG-14, Duluth Group, Duluth (W. Lake Superior); Calumet, Grand Marais, Bayfield, Duluth. Every 3 hours beginning at 0135 G.m.t.

Customs Ports of Entry and Stations

Vessels may be entered and cleared at any port of entry or customs station, but at the latter only with advance authorization from the Customs Service district director.

Northeast Region

St. Albans District:

Ports of Entry: St. Albans, Burlington, and Highgate Springs/Alburg, Vt.

Ogdensburg District:

Ports of Entry: Ogdensburg, Alexandria Bay, Cape Vincent, Champlain-Rouses Point, Clayton, and Massena, N.Y.

Buffalo District:

Ports of Entry: Buffalo-Niagara Falls, Oswego, Rochester, and Sodus Point, N.Y.

North Central Region

Duluth District:

Ports of Entry: Duluth and Grand Portage, Minn.; Superior and Ashland, Wis.

Milwaukee District:

Ports of Entry: Milwaukee, Green Bay, Manitowoc, Marinette, Racine, and Sheboygan, Wis.

Chicago District:

Port of Entry: Chicago, Ill.

Cleveland District:

Ports of Entry: Erie, Pa.; Cleveland, Ashtabula/Conneaut, and Toledo/Sandusky, Ohio.

Customs Stations: Fairport, Lorain, Marblehead-Lakeside, and Put-in-Bay, Ohio.

Detroit District:

Ports of Entry: Detroit, Muskegon, Port Huron, Saginaw-Bay City, and Sault Ste. Marie, Mich.

U.S. Customs Representative: Drummond, Mich.

Customs Stations: Algonac, Mich., Alpena, Mich., De Tour, Mich., Escanaba, Mich., Grand Haven, Mich., Houghton, Mich., Marine City, Mich., Marquette, Mich., Rogers City, Mich., Roberts Landing, Mich.

Foreign-Trade Zones

Foreign-Trade Zone No. 8, 3332 St. Lawrence Drive, Toledo, Ohio 43605.

Foreign-Trade Zone No. 16, 1301 W. Easterday, Sault Ste. Marie, Mich. 49783.

Foreign-Trade Zone No. 22, 4343 W. Ohio Street, Chicago, Ill. 60624.

Foreign-Trade Zone No. 23, 901 Fuhrmann Boulevard, Buffalo, N.Y. 14203.

Foreign-Trade Zone No. 34, 59 Park Avenue, Lockport, N.Y. 14094.

Foreign-Trade Zone No. 40, 101 Erieside Avenue, Cleveland, Ohio 44114.

Foreign-Trade Zone No. 41, 2150 E. College Avenue, Cudahy, Wis. 53110. Bradley Road, Milwaukee, Wis. 53224.

Foreign-Trade Zone No. 51, Seaway Port Authority of Duluth, 1200 Port Terminal Drive, Duluth, Minn. 55808.

Foreign-Trade Zone No. 54, P.O. Box 19, Plattsburgh, N.Y. 12901.

Foreign-Trade Zone No. 55, Greater Burlington Industrial Corp., 135 Church Street, Burlington, Vt. 05402.

Foreign-Trade Zone No. 70, 100 Renaissance Center, Suite 1370, Detroit, Mich. 48243.

National Weather Service Offices.–The following offices will provide forecasts and climatological data or arrange to obtain these services from other offices. They will also check barometers in their offices or by telephone; refer to the local telephone directory for numbers.

Alpena, Mich.: Phelps Collins Airport, Route 2, 49707.

Buffalo, N.Y.: Greater Buffalo International Airport, East Terminal 14225.

Burlington, Vt.: International Airport 05401.

Chicago, Ill.: O'Hare International Airport, P.O. Box 66129, 60666; O'Hare Office Bldg. #2, Room 610, 10600 West Higgins Road, Rosemont, Ill. 60018.

Cleveland, Ohio: Cleveland Hopkins International Airport, Federal Facilities Bldg. 44135.

Detroit, Mich.: Metropolitan Airport, Bldg. 348, 48242.

Duluth, Minn.: International Airport 55811.

Erie, Pa.: International Airport 16505.

Green Bay, Wis.: Route 17, Austin Straubel Field 54303.

Marquette, Mich.: Box 669, 49855.

Milwaukee, Wis.: General Mitchell Field 53207.

Muskegon, Mich.: Muskegon County Airport, 99 Sinclair Drive 49441.

Rochester, N.Y.: Monroe County Airport 14624.

Sault Ste. Marie, Mich.: City-County Airport 49783.

Toledo, Ohio: Toledo Express Airport, R.F.D. 4, Swanton, Ohio 43558.

National Weather Service Weather Broadcasts:

Lake Weather Broadcasts (LAWEB), issued by the National Weather Service, are plain language VHF-FM broadcasts that include reports of wind direction and speed and wave heights from shore stations and ships underway on the lakes. Visibility and weather are included when the visibility is less than ⅞ mile. The observations are taken 1½ hours before the time of broadcast. Outside the navigation season, only Lake Michigan is included in the broadcasts. **Marine Forecasts (MAFOR),** also issued by the National Weather Service, are coded VHF-FM weather forecasts which are preceded by a plain language description of the current weather map. (See National Weather Service forecasts and warnings, chapter 1.)

The following radio stations broadcast LAWEBs at 0230, 0830, 1430, and 2030 e.s.t., and MAFORs at 0002, 0602, 1202, and 1802 e.s.t.

KIL-929, Ripley, N.Y., channel 86 (161.925 MHz)

KQU-440, Cleveland, Ohio, channel 87 (161.975 MHz)

WMI, Lorain, Ohio, channel 26 (161.900 MHz)

KIL-928, Oregon, Ohio, channel 84 (161.825 MHz)

KIL-927, Algonac, Mich., channel 86 (161.925 MHz)

KIL-926, Harbor Beach, Mich., channel 87 (161.975 MHz)

KIL-925, Alpena, Mich., channel 84 (161.825 MHz)

KIL-924, Benton Harbor, Mich., channel 86 (161.925 MHz)

KVY-605, Port Washington, Wis., channel 85 (161.875 MHz)

KVY-604, Sturgeon Bay, Wis., channel 87 (161.975 MHz)

KIL-923, Pickford, Mich., channel 86 (161.925 MHz)

KVY-603, Grand Marais, Mich., channel 84 (161.825 MHz)

KVY-602, Copper Harbor, Mich., channel 87 (161.975 MHz)

KIL-922, Ontonagon, Mich., channel 86 (161.925 MHz)

KVY-601, Duluth, Minn., channel 84 (161.825 MHz)

The following radio stations broadcast LAWEBs during fall and winter and during periods of inclement weather in spring and summer at 0245, 0845, 1445, and 2045 e.s.t., and MAFORs at 0017, 0617, 1217, and 1817 e.s.t.

WLC, Tawas City, Mich., channel 26 (161.900 MHz)

WLC, Rogers City, Mich., channel 26 (161.900 MHz)

WLC, Charlevoix, Mich., channel 26 (161.900 MHz)

WLC, Sault Ste. Marie, Mich., channel 26 (161.900 MHz)

A schedule of Coast Guard radio broadcasts which include weather information is contained elsewhere in the appendix.

NOAA Weather Radio.–National Weather Service VHF-FM radio stations provide mariners with continuous FM broadcasts of weather warnings, forecasts, radar reports, and surface weather observations. These stations usually transmit on 162.55 or 162.40 MHz. Reception range is up to 40 miles from the antenna site, depending on the terrain, type of receiver, and antenna used. The following VHF-FM radio stations with location of antenna are in or near the area covered by this Coast Pilot.

KIG-60, Burlington, Vt., 162.40 MHz (44°32'N., 72°49'W.)

WXL-31, Syracuse, N.Y., 162.55 MHz (42°58'N., 76°12'W.)

KHA-53, Rochester, N.Y., 162.40 MHz (43°08'N., 77°35'W.)

KEB-98, Buffalo, N.Y., 162.55 MHz (42°38'N., 78°46'W.)

KEC-58, Erie, Pa., 162.40 MHz (42°03'N., 80°00'W.)

KHB-59, Cleveland, Ohio, 162.55 MHz (41°24'N., 81°51'W.)

KDO-94, Akron, Ohio, 162.40 MHz (41°04'N., 81°35'W.)

KHB-97, Sandusky, Ohio, 162.40 MHz (41°24'N., 82°49'W.)

WXL-51, Toledo, Ohio, 162.55 MHz (41°37'N., 83°42'W.)

KEC-63, Detroit, Mich., 162.55 MHz (42°28'N., 83°12'W.)

KIH-29, Flint, Mich., 162.40 MHz (43°13'N., 83°43'W.)

KIG-83, Alpena, Mich., 162.55 MHz (45°03'N., 83°43'W.)

KIH-22, Traverse City, Mich., 162.40 MHz (44°45'N., 85°40'W.)

KIG-63, Grand Rapids, Mich., 162.55 MHz (42°52'N., 85°35'W.)

WXJ-57, South Bend, Ind., 162.40 MHz (41°36'N., 86°11'W.)

KWO-39, Chicago, Ill., 162.55 MHz (41°53'N., 87°38'W.)

WXJ-71, Peoria, Ill., 162.475 MHz (40°37'N., 89°34'W.)

KEC-60, Milwaukee, Wis., 162.40 MHz (43°01'N., 88°23'W.)

KIG-65, Green Bay, Wis., 162.55 MHz (44°24'N., 88°00'W.)

KIG-74, Sault Ste. Marie, Mich., 162.55 MHz (46°22'N., 84°24'W.)

KIG-66, Marquette, Mich., 162.55 MHz (46°31'N., 87°29'W.)

WXK-73, Houghton, Mich., 162.40 MHz (47°02'N., 88°41'W.)

KIG-64, Duluth, Minn., 162.55 MHz (46°50'N., 92°04'W.)

WXM-31, Elmira, N.Y., 162.55 MHz (42°06'N., 76°52'W.)

WXL-34, Albany, N.Y., 162.55 MHz (42°38'N., 74°00'W.)

National Weather Service Port Meteorological Officers (PMO's).–Port Meteorological Officers provide assistance on matters of weather chart interpretation, instruments, marine weather communications, and requirements affecting ship operations. (See **National Weather Service,** chapter 1, for further details.) PMO offices in the area covered by this Coast Pilot are as follows:

Cleveland, Ohio: Hopkins International Airport 44135.

Rosemont, Ill.: 10600 West Higgins Road 60018.

Public Health Service Quarantine Stations.–Stations where quarantine examinations are performed:

Chicago, Ill.: U.S. Quarantine Station, O'Hare International Airport, P.O. Box 66012, 60666.

At other ports, quarantine and/or medical examinations are usually performed by Public Health Service contract personnel or by quarantine inspectors from the nearest quarantine station. Inquiries concerning quarantine matters should be directed to the nearest quarantine station.

Food and Drug Administration (FDA) Regional Offices

Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont): 585 Commercial Street, Boston, Mass. 02109.

Region II (New Jersey, New York, Puerto Rico, Virgin Islands): 830 Third Avenue, Brooklyn, N.Y. 11232.

Region III (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia): U.S. Customhouse, Room 900, 2nd & Chestnut Streets, Philadelphia, Pa. 19106.

Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin): 1410 CNA Building, 55 East Jackson Boulevard, Chicago, Ill. 60604.

Department of Agriculture, Animal and Plant Health Inspection Service (APHIS) Offices.–Listed below are ports covered by this volume where APHIS inspectors are available to inspect plants and plant and animal products, and locations of Animal Import Centers where livestock and birds are inspected.

Information on importation of plants, animals, and plant and animal products is available from APHIS, Department of Agriculture, Federal Building, 6505 Belcrest Road, Hyattsville, Md. 20782. The specific offices to contact are as follows: for plants, including fruits and vegetables, and plant products, Plant Protection and Quarantine, Regulatory Services Staff, Room 643, telephone 301–436–8247; for animal products, Import-Export Animals and Products Staff, Room 838, telephone 301-436-8499; and for live ruminants, swine, equines, and poultry and other birds, Veterinary Services, Import-Export Animals and Products Staff, Room 838, telephone 301–436–8170.

New York:

Rouses Point: St. John's Highway Border Station, Room 118, Route 9-B, P.O. Box 278, 12979.

Buffalo: Federal Building, Room 1113, 111 W. Huron Street 14202.

Ohio:

Cleveland: Federal Building, Room 1749, 1240 E. 9th Street 44199.

Michigan:

Detroit: International Terminal, Room 228, Metropolitan Airport 48242.

Illinois:

Chicago: U.S. Custom House, Room 800, 610 S. Canal Street 60607.

Wisconsin:

Milwaukee: International Arrivals Terminal, General Mitchell Field 53207.

Minnesota:

Duluth: Board of Trade Bldg., Room 420, 301 W. First Street 55802.

Animal Import Centers:

Honolulu, Hawaii: 300 Ala Moana Boulevard, Room 4320, 96850.

Miami, Fla., 8120 NW 53rd Street, Suite 102, 33166.

Rock Tavern, N.Y.: New York Animal Import

Center, Stewart Airport, Rural Route 1, Box 74, 12575.

Immigration and Naturalization Service Offices

Illinois:

Chicago: Dirksen Federal Bldg., 219 South Dearborn Street 60604.

Michigan:

Algonac: 202 Fruit Street 48001.

Detroit: Federal Bldg., 333 Mt. Elliott Street 48207.

Marine City: 451 South Water Street 48039.

Muskegon: International Terminal 49440.

Port Huron: Pinegrove and Elmwood Streets 48060.

Sault Ste. Marie: International Bridge Plaza 49783.

Trenton: 23100 West Road 48183.

Minnesota:

Duluth: U.S. Courthouse and Customhouse, 515 West First Street 55802.

Grand Marais: P.O. Box 685, 55604.

Grand Portage: 55605.

New York:

Alexandria Bay: Heart Island off Alexandria Bay 13607.

Buffalo: 68 Court Street 14202.

Cape Vincent: Horne's Ferry Service 13618.

Clayton: Riverside Drive 13624.

Lewiston: P.O. Box 305, 14092.

Massena: P.O. Box 195, Rooseveltown, 13683.

Niagara Falls: Rainbow Bridge 14303.

Ogdensburg: Ogdensburg-Prescott Bridge 13669.

Rochester: 410 Old Post Office Bldg. 14614.

Rouses Point: P.O. Box 247, 12979.

Youngstown: 14301.

Ohio:

Ashtabula: Marine Bank Bldg., 325 Hulbert Avenue 44004.

Cleveland: Anthony J. Celebrezze Federal Bldg., 1240 East 9th Street 44199.

Sandusky: Post Office Bldg. 44870.

Toledo: Federal Office Bldg., 234 Summit Street 43604.

Vermont:

Alburg: State Route 225, 05440.

Burlington: Federal Bldg., Elmwood Avenue 05401.

Wisconsin:

Milwaukee: Federal Bldg., 517 East Wisconsin Avenue 53202.

Federal Communications Commission Offices

District Field Offices:

Buffalo, N.Y.: 1307 Federal Bldg., 111 West Huron Street 14202.

Chicago, Ill.: Park Ridge Office Center, Room 306, 1550 Northwest Highway, Park Ridge 60068.

Detroit, Mich.: 24897 Hathaway Street, Farmington Hills 48018.

New York, N.Y.: 201 Varick Street 10014.

St. Paul, Minn.: 691 Federal Bldg. and U.S. Courthouse, 316 North Robert Street 55101.

Government Printing Office

Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Saint Lawrence Seaway Development Corporation Offices

Saint Lawrence Seaway Development Corporation, 800 Independence Avenue SW., Washington, D.C. 20591.

Saint Lawrence Seaway Development Corporation, Box 520, Massena, N.Y. 13662.

Pilotage.–Pilot associations serving the Great Lakes are listed below with their dispatch office addresses and telephone numbers. Vessels entering the St. Lawrence River from sea make arrangements for pilotage service in advance through ships' agents to Laurentian Pilotage Authority. Vessels already on the Great Lakes and requiring pilotage service notify the nearest dispatch office 12 hours in advance and make a follow-up confirmation 4 hours in advance. (See **46 CFR 401**, chapter 2, and Pilotage, chapter 3 and at the beginning of chapters 4 through 13, for more information.)

Great Lakes Pilotage Authority, Ltd., P.O. Box 95, Cornwall, Ont., Canada (613-933-2991).

Great Lakes Pilotage Authority, Ltd., P.O. Box 2008, Station B, St. Catharines, Ont., Canada (416-934-2921).

Lakes Pilots Association, P.O. Box 902, 802 Sedgwick Street, Port Huron, Mich. 48060 (313-984-2541, 313-982-1762, 313-961-1709).

Laurentian Pilotage Authority, 1080 Beaver Hall Hill, Room 1806, Montreal 128, Que., Canada (514-283-6322).

St. Lawrence Seaway Pilots Association, P. O. Box 274, Cape Vincent, N.Y. 13618 (315-654-2900).

Upper Great Lakes Pilots, Inc., 802 Garfield Avenue, Duluth, Minn. 55802 (218-722-1425); De Tour, Mich. (906-297-5111); Chicago, Ill. (312-734-6311); Milwaukee, Wis. (414-383-5546); or Central Dispatch, Inc., Duluth, Minn. (218-722-1852).

Canadian Government Agencies

Dominion Hydrographer, Canadian Hydrographic Service, Department of Fisheries and Oceans, Ottawa, Ontario K1A 0E6, Canada.

Hydrographic Chart Distribution Office, Department of Fisheries and Oceans, P.O. Box 8080, 1675 Russell Road, Ottawa, Ontario K1G 3H6, Canada.

Atmospheric Environment Service, Department of Fisheries and Oceans, 4905 Dufferin Street, Downsview, Ontario M3H 5T4, Canada.

Ocean and Aquatic Sciences, Department of Fisheries and Oceans, P.O. Box 5050, Burlington, Ontario L7R 4A6, Canada.

Canadian Hydrographic Service, Department of Fisheries and Oceans, Ottawa, Ontario K1A 0E6, Canada.

Director, Aids and Waterways, Canadian Coast Guard, Department of Transport, Ottawa, Ontario K1A 0N7, Canada.

Canadian Coast Guard, Department of Transport, 1 Yonge Street, Toronto, Ontario M5E 1E5, Canada.

Canadian Government Publishing Centre, Supply and Services Canada, Ottawa K1A 0S9, Canada.

Superintendent-in-Charge, Department of Indian Affairs and Northern Development, 132 Queens Avenue, London, Ontario N6A 1H8, Canada.

Canada Employment & Immigration Commission/Department, E.A. Bourque Memorial Building, 305 Rideau Street, Ottawa, Ontario K1A 0J9, Canada.

Superintendent, Parks Canada, Ashburnham Drive, P.O. Box 567, Peterborough, Ontario K9J 6Z6, Canada.

Canadian Customs Offices

Director General, International Traffic Programs, Attn: Passenger Programs Directorate, Connaught Bldg., MacKenzie Avenue, Ottawa, Ontario K1A 0L5, Canada.

Ottawa Region: 1650 Carling Avenue, Ottawa, Ontario K2A 3Y1, Canada. Telephone 613-593-7222.

Hamilton Region: 10 John Street S., P.O. Box 989, Hamilton, Ontario L8N 3V8, Canada. Telephone 416-523-2812.

London Region: 451 Talbot Street, P.O. Box 5940, Terminal "A", London, Ontario N6A 4T9, Canada. Telephone 519-679-5065.

Toronto Region: 55 Bloor Street W., P.O. Box 10, Station "A", Toronto, Ontario M6W 1A3, Canada. Telephone 416-966-8266.

Windsor Region: 185 Ouellette, Windsor, Ontario N9A 4H8, Canada. Telephone 519-254-9202, Extension 238.

Winnipeg Region: Federal Bldg., 269 Main Street, Winnipeg, Manitoba R3C 1B3, Canada. Telephone 204-949-3064.

Vessels reporting from stations not manned by customs personnel may contact customs by calling, toll free, 1-800-267-0976.

St. Lawrence Seaway Authority (Canada) Offices

The St. Lawrence Seaway Authority, Transport Canada Bldg., Place de Ville, Tower A, 320 Queen Street, Ottawa, Ontario K1R 5A3, Canada.

The St. Lawrence Seaway Authority, 202 Pitt Street, Cornwall, Ontario K6J 3P7, Canada.

The St. Lawrence Seaway Authority, P.O. Box 370, St. Catharines, Ontario L2R 6V8, Canada.

The St. Lawrence Seaway Authority, P.O. Box 97, Administration Bldg., St. Lambert Lock, St. Lambert, P. Q. J4P 3N7, Canada.

CLIMATOLOGICAL TABLES

These tables were prepared by the Environmental Data Service. Station level pressure refers to the actual pressure taken at the elevation of the station. Where it has been reduced to sea level, the term sea level pressure is used. Time given is local standard time.

* means less than 0.5 percent.
* means less than 0.5 day.
* means trace (not measurable) of precipitation.

ROCHESTER, NEW YORK (43°17'N., 77°39'W.) Elevation 560 ft. (170.7m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)														
TEMPERATURE (DEGREES F)														
Mean	24.0	24.8	33.0	46.1	56.5	66.9	71.2	69.3	62.3	52.3	40.5	28.3	47.9	30
Mean Daily Maximum	31.3	32.6	41.1	56.0	67.2	78.0	82.2	80.1	73.1	62.4	47.9	34.9	57.2	30
Mean Daily Minimum	16.7	16.9	24.9	36.1	45.7	55.8	60.2	58.5	51.5	42.2	33.1	21.7	38.6	30
Extreme Highest	74	67	84	93	94	100	98	99	99	91	81	69	100	30
Extreme Lowest	-16	-19	-5	13	26	35	42	36	28	20	5	-16	-19	30
Minimum 32 Degrees F or Less, Mean Number of Days	17	15	7	1	0	0	0	0	0	0	2	11	52	30
RELATIVE HUMIDITY														
Average Percentage (0700L)	76	77	78	77	78	80	82	87	89	85	82	81	81	30
Average Percentage (1300L)	68	67	63	54	55	56	53	57	61	62	69	75	62	30
CLOUD COVER														
Mean Number of Days with Clear Skies	2	2	4	6	6	7	8	8	7	7	2	2	61	30
Mean Number of Days with Cloudy Skies	22	19	18	15	15	12	10	11	12	16	22	24	196	30
PRECIPITATION														
Mean Amount (Inches)	2.25	2.42	2.57	2.74	2.80	2.54	2.89	2.97	2.35	2.62	2.83	2.35	31.33	30
Greatest Amount (Inches)	5.79	5.07	5.42	4.90	6.62	6.56	9.70	5.95	6.30	7.85	5.51	5.05	9.70	30
Least Amount (Inches)	0.81	0.74	0.47	1.28	0.36	0.22	0.98	0.76	0.28	0.23	0.44	0.62	0.22	30
Maximum in 24 hrs. (Inches)	1.64	2.43	2.21	1.99	3.85	2.86	2.94	2.39	3.54	2.52	3.13	1.60	3.85	30
Mean Amount of Snow (Inches)	22.9	22.8	14.2	3.3	0.1	0.0	0.0	*	*	0.2	6.6	19.0	89.1	39
Maximum Snowfall in 24 hrs. (Inches)	18.2	22.8	17.6	8.3	2.0	0.0	0.0	*	*	1.4	11.2	19.1	22.8	30
Mean Number of Days with Snow (One Inch or More)	7	7	4	1	*	0	0	0	0	*	2	6	27	30
0.01 Inch or More, Mean Number of Days	17	16	15	13	12	10	10	10	10	11	15	18	156	30
WIND														
Direction (Percentage of Obs.): at 0700L														
North	4.0	5.0	6.0	7.5	5.5	4.9	3.0	1.7	3.2	3.5	5.0	4.7		10
Northeast	2.1	4.7	3.8	5.6	5.7	6.3	1.4	2.1	1.3	2.1	3.6	3.6		10
East	5.8	6.1	10.1	6.1	6.3	4.9	2.1	2.1	3.7	6.1	7.8	13.7		10
Southeast	8.2	7.6	8.7	5.0	7.0	5.5	1.7	3.2	6.6	6.2	10.3	9.4		10
South	16.6	14.2	13.8	11.9	18.9	23.2	23.4	22.2	21.4	22.7	17.3	12.0		10
Southwest	25.0	20.6	17.0	23.2	22.4	31.6	41.7	42.8	34.0	28.1	20.7	17.2		10
West	28.2	28.2	26.5	25.7	23.1	15.9	19.5	19.2	20.4	18.6	23.2	26.3		10
Northwest	8.4	10.5	11.0	9.6	6.7	4.0	4.0	4.4	5.6	5.8	7.5	10.5		10
Calm	1.9	3.3	3.0	5.7	4.6	3.7	3.4	2.5	4.2	7.3	4.5	2.9		10
Direction (Percentage of Obs.): at 1300L														
North	3.6	8.1	8.1	13.4	15.7	12.0	9.0	9.0	7.9	5.1	5.9	5.4		10
Northeast	2.4	4.0	6.7	8.5	9.6	7.8	4.4	5.3	4.8	4.0	4.7	3.6		10
East	6.4	6.2	10.5	5.5	8.3	6.1	4.0	4.2	7.4	8.0	7.6	13.0		10
Southeast	5.0	6.9	7.7	2.8	7.1	6.7	3.4	6.6	6.8	7.6	6.7	8.3		10
South	13.6	13.5	8.5	8.0	8.8	12.4	13.0	10.3	13.4	19.4	15.9	12.4		10
Southwest	21.8	15.0	10.8	11.2	11.9	19.4	22.8	17.0	18.0	17.9	16.0	13.1		10
West	34.8	31.0	31.4	30.8	24.1	22.7	29.7	31.1	24.0	23.8	27.5	29.0		10
Northwest	10.7	14.1	15.4	19.2	14.5	13.0	13.9	16.3	17.6	13.3	15.8	14.4		10
Calm	2.0	1.4	1.4	0.8	0.4	0.1	0.3	0.3	0.3	1.2	0.1	1.0		10
VISIBILITY														
Days with Dense Fog	1	1	1	1	1	1	1	1	1	2	1	1	13	39

NIAGARA FALLS, NEW YORK (43°06'N., 78°57'W.) Elevation 600 ft. (182.9m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1017.2	1015.7	1015.1	1014.6	1015.5	1014.0	1015.2	1015.4	1017.4	1017.9	1016.1	1016.2	1015.9	17
TEMPERATURE (DEGREES F)														
Mean	24.0	26.1	32.6	46.8	55.9	66.4	71.5	69.9	62.1	52.6	40.9	29.0	48.2	17
Mean Daily Maximum	30.1	32.6	39.4	56.2	65.9	76.2	80.9	79.1	71.4	61.2	47.2	34.5	56.2	17
Mean Daily Minimum	17.5	19.0	25.2	36.9	45.5	56.0	61.5	60.2	52.2	43.4	34.1	22.9	39.5	17
Extreme Highest	56	61	71	83	87	93	94	93	96	84	79	61	96	17
Extreme Lowest	-16	-5	-8	12	29	37	46	45	30	23	-2	-4	-16	17
RELATIVE HUMIDITY														
Average Percentage (0700L)	81.4	80.9	81.0	79.8	77.6	78.0	78.8	82.2	83.6	82.7	81.4	81.4	80.7	15
Average Percentage (1300L)	76.9	72.8	68.6	60.6	58.3	56.8	54.7	56.1	59.2	61.7	69.3	75.1	64.2	15
PRECIPITATION														
Mean Amount (Inches)	2.80	2.49	2.79	3.04	3.12	1.87	2.59	4.31	2.51	2.50	3.05	2.86	33.93	17
Greatest Amount (Inches)	4.62	4.54	4.88	4.72	6.46	4.28	4.09	8.96	3.94	7.18	6.06	4.04		17
Least Amount (Inches)	1.77	0.56	0.75	1.64	0.70	0.23	0.55	0.79	1.06	0.26	1.86	1.09		17
Maximum in 24 hrs. (Inches)	1.41	3.13	2.30	1.60	1.86	2.52	1.54	3.24	2.40	2.42	1.55	1.10	3.24	17
Mean Amount of Snow (Inches)	16.9	15.3	10.1	1.7	*	0	0	0	*	0.2	6.8	15.0	66.0	17
Maximum Snowfall in 24 hrs. (Inches)	7.6	9.4	8.8	3.1	0.4	0	0	0	*	2.3	9.6	8.0	9.4	17
WIND														
Direction (Percentage of Obs.): at 0700L														
North	7.8	6.7	7.1	7.5	7.6	7.6	5.8	7.4	4.1	6.9	6.5	6.9	6.8	12-15
Northeast	5.2	6.0	9.2	8.4	5.8	5.3	5.1	5.6	6.4	5.6	6.5	6.7	6.3	12-15
East	11.1	8.1	12.5	13.1	9.5	6.8	5.4	7.2	9.5	10.3	8.9	10.3	9.4	12-15
Southeast	4.4	5.0	5.1	5.1	5.5	5.6	4.4	6.7	6.4	7.9	7.4	4.8	5.7	12-15
South	9.9	12.7	9.4	14.2	15.9	16.2	16.1	14.7	14.1	15.1	10.9	10.1	13.3	12-15
Southwest	21.0	18.9	17.7	17.9	23.6	22.4	22.1	17.0	18.9	17.9	19.6	19.9	19.7	12-15
West	20.3	18.3	15.3	11.5	9.8	11.3	12.0	10.2	13.2	11.1	21.3	20.8	14.6	12-15
Northwest	11.0	14.6	11.0	9.7	7.8	10.5	10.5	10.4	7.6	7.7	8.4	9.2	9.9	12-15
Calm	9.3	9.7	12.7	12.6	14.5	14.3	18.6	20.8	19.8	17.5	10.5	11.3	14.3	12-15
Direction (Percentage of Obs.): at 1600L														
North	6.4	9.1	9.0	11.9	13.4	13.3	14.4	13.8	11.9	10.4	7.5	5.7	10.6	12-15
Northeast	7.6	8.2	11.6	12.8	12.7	9.7	8.3	10.0	8.4	10.5	7.8	7.9	9.6	12-15
East	7.9	7.1	7.6	8.1	5.4	3.9	3.5	4.2	5.2	6.6	5.4	10.0	6.2	12-15
Southeast	3.0	3.2	2.6	3.0	2.8	2.2	2.4	2.0	2.5	2.2	6.2	3.4	3.0	12-15
South	10.1	10.0	7.9	9.6	10.3	10.7	9.3	10.2	10.1	13.0	13.6	8.3	10.3	12-15
Southwest	25.9	24.2	20.4	25.4	26.7	32.4	33.0	30.7	30.0	26.8	22.2	23.8	26.8	12-15
West	20.4	19.7	18.7	13.6	12.4	11.7	9.8	11.3	13.2	13.1	20.8	23.3	15.7	12-15
Northwest	13.5	15.1	17.6	12.4	13.2	14.2	15.6	14.5	14.4	13.0	11.7	11.1	13.9	12-15
Calm	5.2	3.4	4.6	3.2	3.1	1.9	3.7	3.3	4.3	4.4	4.8	6.5	4.0	12-15

BUFFALO, NEW YORK (42°56'N., 78°44'W.) Elevation 705 ft. (214.9m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1017.9	1016.1	1015.5	1015.7	1014.8	1014.6	1015.7	1016.8	1017.8	1018.7	1016.0	1017.4	1016.4	11
TEMPERATURE (DEGREES F)														
Mean	24.9	24.5	32.4	43.4	54.7	64.7	70.3	68.9	62.5	51.7	40.0	29.5	47.3	40
Mean Daily Maximum	31.3	31.4	39.5	51.5	63.1	72.4	78.0	76.8	70.5	59.1	46.2	35.3	54.6	40
Mean Daily Minimum	18.4	17.6	25.2	35.2	46.2	57.0	62.6	61.0	54.5	44.2	33.8	23.6	39.9	40
Extreme Highest	72	64	81	87	90	95	94	99	98	87	80	66	99	35
Extreme Lowest	-12	-20	-4	12	26	35	43	38	32	20	9	-4	-20	35
Minimum 32 Degrees F or Less, Mean Number of Days	29	26	25	12	1	0	0	0	*	3	14	26	136	18
RELATIVE HUMIDITY														
Average Percentage (0700L)	79	80	80	76	76	78	79	83	83	82	82	82	80	18
Average Percentage (1300L)	73	71	67	58	56	57	55	58	60	61	70	75	63	18
CLOUD COVER														
Mean Number of Days with Clear Skies	1	2	4	5	6	6	7	7	7	7	2	1	55	35
Mean Number of Days with Cloudy Skies	23	21	20	17	16	12	11	12	14	16	23	24	209	35
PRECIPITATION														
Mean Amount (Inches)	3.10	2.71	2.75	3.69	2.89	2.76	2.91	3.18	3.02	3.03	3.22	3.23	35.49	40
Greatest Amount (Inches)	6.47	5.80	5.59	5.90	6.39	6.06	6.43	10.67	8.99	9.13	6.37	8.02	53.55	35
Least Amount (Inches)	1.03	0.81	1.20	1.27	1.21	0.11	0.99	1.10	0.77	0.30	1.44	0.69	28.55	35
Maximum in 24 hrs. (Inches)	2.40	2.31	2.14	1.71	2.03	3.04	3.38	3.88	3.63	3.49	2.51	2.16	3.88	35
Mean Amount of Snow (Inches)	23.9	18.2	12.0	3.1	0.1	0	0	0	*	0.3	12.9	22.4	92.9	40
Maximum Snowfall in 24 hrs. (Inches)	18.2	14.5	15.8	6.8	2.0	0	0	0	*	2.5	19.9	24.3	24.3	35
Mean Number of Days with Snow (One Inch or More)	7	6	4	1	*	0	0	0	0	*	3	6	27	35
0.01 Inch or More, Mean Number of Days	20	17	16	14	13	10	10	11	11	11	16	20	169	35
WIND														
Direction (Percentage of Obs.)														
North	5.8	7.9	8.3	8.0	8.2	7.9	8.1	8.0	9.9	7.4	8.5	8.3	8.1	10
Northeast	5.7	7.7	8.4	8.3	9.5	8.3	5.7	6.0	7.8	5.8	7.3	6.9	7.3	10
East	8.3	9.6	11.6	9.9	10.3	7.7	5.4	4.9	8.7	8.1	8.7	12.8	8.8	10
Southeast	4.7	4.6	5.4	6.3	6.2	5.4	4.4	5.7	6.9	7.2	5.7	6.4	5.8	10
South	11.6	11.8	10.1	11.4	12.9	17.7	17.2	20.5	19.8	21.4	18.3	14.0	15.5	10
Southwest	19.8	19.2	18.5	25.1	24.9	28.2	29.4	25.4	20.2	18.9	16.7	15.0	21.8	10
West	34.9	28.9	24.7	21.0	20.0	18.3	20.3	19.2	17.1	20.3	23.9	25.7	22.8	10
Northwest	8.1	8.6	11.3	8.0	5.6	4.3	6.4	6.8	7.3	8.8	10.1	9.4	7.9	10
Calm	1.1	1.7	1.7	2.0	2.4	2.2	3.1	3.5	2.3	2.1	0.8	1.5	2.0	10
VISIBILITY														
Days with Dense Fog	2	2	3	2	2	1	1	1	1	1	1	1	19	35

ERIE, PENNSYLVANIA (42°05'N., 80°11'W.) Elevation 731 ft. (222.8m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1018.8	1016.1	1016.7	1016.5	1015.7	1015.4	1016.2	1017.3	1017.9	1018.3	1017.0	1017.5	1017.0	13-15
TEMPERATURE (DEGREES F)														
Mean	27.2	26.6	34.5	45.3	56.5	66.5	71.3	69.8	63.9	53.2	41.8	31.6	49.0	40
Mean Daily Maximum	33.8	33.7	41.9	53.3	64.8	74.5	78.9	77.4	71.6	60.6	47.9	37.3	56.3	40
Mean Daily Minimum	20.6	19.4	27.0	37.3	48.2	58.5	63.6	62.2	56.2	45.8	35.6	25.8	41.7	40
Extreme Highest	64	67	79	85	89	92	94	92	94	88	80	68	94	25
Extreme Lowest	-15	-12	-3	12	26	32	44	41	33	24	7	-2	-15	25
Minimum 32 Degrees F or Less, Mean Number of Days	17	15	8	*	0	0	0	0	0	0	2	11	54	13
RELATIVE HUMIDITY														
Average Percentage (0700L)	77	78	78	75	78	62	82	86	86	79	78	79	80	13
Average Percentage (1300L)	73	71	67	61	64	66	65	66	68	66	72	75	68	13
CLOUD COVER														
Mean Number of Days with Clear Skies	2	3	4	6	7	8	9	9	7	7	2	1	65	23
Mean Number of Days with Cloudy Skies	25	19	19	16	14	11	10	11	14	16	23	26	204	23
PRECIPITATION														
Mean Amount (Inches)	2.70	2.40	2.78	3.08	3.36	3.41	3.24	3.25	3.56	3.46	3.45	2.85	37.54	40
Greatest Amount (Inches)	4.59	5.01	6.78	7.11	5.59	7.74	7.70	11.06	10.65	9.87	6.25	5.63	61.70	25
Least Amount (Inches)	0.90	0.57	0.63	1.63	1.45	0.85	0.65	0.58	1.45	1.13	1.52	1.38	27.41	25
Maximum in 24 hrs. (Inches)	1.51	2.16	1.87	2.53	2.23	2.80	3.22	3.29	4.84	4.35	2.86	2.31	4.84	23
Mean Amount of Snow (Inches)	21.9	14.6	10.8	2.6	*	0	0	0	0	0.5	12.1	21.1	83.6	40
Maximum Snowfall in 24 hrs. (Inches)	10.2	12.4	12.0	10.0	0.2	0	0	0	0	2.3	23.0	12.9	23.0	24
Mean Number of Days with Snow (One Inch or More)	8	5	3	1	0	0	0	0	0	*	3	7	27	23
0.01 Inch or More, Mean Number of Days	18	15	15	14	12	10	9	11	11	12	16	19	161	23
WIND														
Direction (Percentage of Obs.)														
North	5.1	7.5	9.0	8.7	9.4	8.5	9.9	10.9	10.1	8.9	8.2	7.9	8.6	10
Northeast	6.0	10.1	12.8	11.4	11.9	9.1	7.4	6.2	8.1	5.7	5.3	6.1	8.3	10
East	4.9	6.2	6.3	6.6	6.6	4.3	4.0	4.3	6.0	3.9	5.6	7.2	5.5	10
Southeast	5.3	4.5	6.0	5.3	5.7	4.4	4.7	4.8	7.1	6.7	6.0	6.9	5.6	10
South	25.7	22.2	20.2	22.4	23.0	33.0	32.2	32.8	35.7	38.7	29.4	25.2	28.5	10
Southwest	20.7	15.6	12.4	12.8	13.3	15.7	14.5	14.3	12.5	15.4	19.6	18.8	15.5	10
West	22.7	22.9	29.2	22.0	18.3	15.1	16.1	15.2	10.3	10.3	14.4	16.5	17.1	10
Northwest	9.0	9.7	10.4	9.0	10.0	8.6	9.1	9.8	9.0	9.5	10.7	10.4	9.6	10
Calm	0.5	1.3	1.7	1.8	1.8	1.3	2.1	1.7	1.2	0.9	0.8	1.0	1.3	10
VISIBILITY														
Days with Dense Fog	1	2	3	2	2	1	*	*	*	*	1	1	14	23

CLEVELAND, OHIO (41°25'N., 81°52'W.) Elevation 777 ft. (236.8m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1019.0	1017.3	1016.4	1015.8	1015.4	1015.2	1016.3	1017.1	1017.8	1018.8	1017.4	1017.9	1017.0	21
TEMPERATURE (DEGREES F)														
Mean	27.2	27.7	36.0	47.1	58.2	67.9	72.2	70.6	64.6	53.7	41.6	31.2	49.9	40
Mean Daily Maximum	34.1	35.0	43.7	55.7	67.0	76.6	80.5	78.9	73.1	61.9	48.3	37.4	57.7	40
Mean Daily Minimum	20.3	20.4	28.3	38.5	49.4	59.2	63.8	62.3	56.1	45.5	34.8	25.0	42.0	40
Extreme Highest	73	69	83	88	92	101	103	102	101	90	82	69	103	37
Extreme Lowest	-19	-15	-5	10	25	31	41	41	32	22	3	-11	-19	37
Minimum 32 Degrees F or Less, Mean Number of Days	28	25	21	10	1	*	0	0	0	3	12	25	125	18
RELATIVE HUMIDITY														
Average Percentage (0700L)	77	77	78	76	78	80	82	86	85	80	79	77	79	18
Average Percentage (1300L)	70	68	65	57	58	59	58	60	61	60	67	71	63	18
CLOUD COVER														
Mean Number of Days with Clear Skies	3	3	4	5	6	7	9	9	9	9	3	2	69	37
Mean Number of Days with Cloudy Skies	23	20	20	17	15	12	10	10	12	14	21	23	197	37
PRECIPITATION														
Mean Amount (Inches)	2.54	2.34	2.87	2.80	3.13	3.34	3.39	2.99	3.11	2.59	2.62	2.46	34.18	40
Greatest Amount (Inches)	7.01	4.64	6.07	6.61	6.04	9.06	6.47	8.96	6.37	9.50	6.44	5.60	50.38	37
Least Amount (Inches)	0.36	0.48	0.78	1.18	1.00	1.17	1.23	0.53	0.74	0.61	0.80	0.71	18.63	37
Maximum in 24 hrs. (Inches)	2.33	2.33	2.76	2.24	3.73	4.00	2.87	3.07	2.26	3.44	2.23	2.06	4.00	37
Mean Amount of Snow (Inches)	11.6	11.0	9.9	2.1	0.1	0	0	0	*	0.7	5.7	11.4	52.5	40
Maximum Snowfall in 24 hrs. (Inches)	10.5	10.6	14.9	7.6	2.1	0	0	0	*	6.7	15.0	12.2	15.0	37
Mean Number of Days with Snow (One Inch or More)	4	4	3	1	*	0	0	0	0	*	2	4	18	37
0.01 Inch or More, Mean Number of Days	16	15	16	14	13	11	10	9	10	11	15	16	156	37
WIND														
Direction (Percentage of Obs.)														
North	6.3	12.6	16.0	16.4	17.9	17.3	17.2	15.2	13.9	6.8	8.0	7.0	12.8	10
Northeast	4.1	7.4	10.0	9.4	10.5	7.2	6.7	6.2	6.6	3.7	3.6	4.9	6.7	10
East	3.6	4.4	4.5	5.1	4.3	3.2	3.2	3.0	5.6	3.5	3.5	4.4	4.0	10
Southeast	6.7	7.1	8.1	8.0	8.5	5.8	5.2	5.3	8.2	10.5	7.7	9.4	7.6	10
South	24.9	18.7	18.5	21.0	19.9	26.4	25.2	24.5	26.9	31.2	24.7	23.4	23.8	10
Southwest	26.3	21.1	15.1	16.0	16.0	21.6	22.4	23.7	19.1	21.8	26.2	22.4	21.0	10
West	19.5	16.1	16.0	11.7	11.0	8.3	9.5	9.7	8.1	10.7	16.1	17.5	12.8	10
Northwest	7.6	11.7	10.8	10.7	9.1	7.2	7.1	7.5	7.2	8.8	9.2	9.8	8.9	10
Calm	1.0	0.9	1.0	1.7	2.8	3.0	3.5	4.9	4.4	3.0	1.0	1.2	2.4	10
VISIBILITY														
Days with Dense Fog	2	2	2	1	1	1	1	1	1	1	1	1	13	37

TOLEDO, OHIO (41°36'N., 83°48'W.) Elevation 669 ft. (203.9m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1019.3	1017.6	1016.1	1016.2	1014.8	1014.3	1016.1	1017.6	1018.2	1019.0	1016.9	1017.8	1017.0	10
TEMPERATURE (DEGREES F)														
Mean	25.7	27.0	35.9	47.6	59.0	68.8	73.2	71.1	64.4	53.0	40.4	29.6	49.7	40
Mean Daily Maximum	32.8	34.5	44.1	56.9	68.9	78.6	83.1	80.9	74.2	62.4	47.8	36.2	58.4	40
Mean Daily Minimum	18.5	19.4	27.6	38.2	49.1	59.0	63.2	61.3	54.6	43.6	32.9	22.9	40.9	40
Extreme Highest	62	68	80	88	95	99	101	98	98	91	78	67	101	23
Extreme Lowest	-17	-14	-5	11	25	32	43	37	26	15	2	-12	-17	23
Minimum 32 Degrees F or Less, Mean Number of Days	29	26	23	11	2	*	0	0	*	7	18	27	145	23
RELATIVE HUMIDITY														
Average Percentage (0700L)	79	78	80	79	79	82	85	90	90	84	83	82	83	23
Average Percentage (1300L)	69	65	61	54	52	54	54	57	57	55	66	73	60	23
CLOUD COVER														
Mean Number of Days with Clear Skies	5	4	5	6	7	7	7	9	9	9	4	3	75	23
Mean Number of Days with Cloudy Skies	20	16	19	16	14	12	10	10	12	13	19	21	182	23
PRECIPITATION														
Mean Amount (Inches)	2.19	1.93	2.58	2.83	3.17	3.45	2.96	2.85	2.66	2.26	2.34	2.37	31.59	40
Greatest Amount (Inches)	4.61	4.43	4.88	6.10	5.13	6.51	6.75	8.47	8.10	3.72	4.63	6.81	40.85	23
Least Amount (Inches)	0.27	0.27	0.58	0.88	0.96	1.89	0.68	0.40	0.58	0.28	0.55	0.54	22.05	23
Maximum in 24 hrs. (Inches)	1.78	1.51	1.56	3.43	1.96	3.21	4.35	2.42	3.97	1.71	2.06	3.53	4.39	23
Mean Amount of Snow (Inches)	9.9	8.2	6.5	1.6	*	0	0	0	*	*	3.5	9.5	39.2	40
Maximum Snowfall in 24 hrs. (Inches)	10.4	7.4	7.8	9.8	*	0	0	0	*	0.2	8.3	13.9	13.9	23
Mean Number of Days with Snow (One Inch or More)	3	2	2	1	0	0	0	0	0	0	1	3	12	23
0.01 Inch or More, Mean Number of Days	13	11	13	12	12	11	9	9	10	8	12	15	136	23
WIND														
Direction (Percentage of Obs.)														
North	7.2	10.4	10.9	9.3	9.1	9.6	8.9	9.8	10.3	6.5	7.3	7.7	8.9	10
Northeast	5.2	9.7	11.1	9.7	10.5	8.9	8.8	6.7	8.1	4.7	5.2	5.9	7.9	10
East	8.1	9.7	14.5	14.2	15.4	10.5	8.6	7.1	9.6	8.2	7.0	10.3	10.3	10
Southeast	5.4	4.9	5.3	7.0	7.4	5.0	5.3	5.2	7.2	9.3	6.0	7.5	6.3	10
South	13.0	10.7	11.7	13.7	11.8	17.0	14.9	15.5	16.6	18.3	15.3	13.6	14.3	10
Southwest	24.4	16.7	12.8	14.6	14.2	21.2	21.0	21.0	16.9	19.3	22.1	20.1	18.7	10
West	26.4	22.5	19.8	18.4	18.5	16.0	17.8	17.1	15.3	18.6	24.1	22.2	19.7	10
Northwest	8.7	13.1	12.1	10.9	11.1	7.3	8.6	9.8	8.3	10.0	10.8	10.5	10.1	10
Calm	1.6	2.3	1.8	2.2	2.0	4.5	6.1	7.8	7.7	5.1	2.2	2.2	3.8	10
VISIBILITY														
Days with Dense Fog	2	2	2	1	1	1	1	2	2	2	2	2	18	23

DETROIT, MICHIGAN (42°14'N., 83°20'W.) Elevation 633 ft. (192.9m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1018.4	1017.0	1016.2	1015.3	1014.9	1014.5	1015.6	1016.4	1017.3	1018.0	1016.6	1017.2	1016.5	21
TEMPERATURE (DEGREES F)														
Mean	22.5	25.3	34.9	47.3	58.2	67.7	71.7	70.5	63.5	51.8	39.8	28.1	48.5	40
Mean Daily Maximum	30.0	33.2	43.4	57.8	69.6	79.1	83.0	81.7	74.4	62.4	47.6	34.9	58.1	40
Mean Daily Minimum	15.0	17.4	26.4	36.7	46.8	56.2	60.4	59.3	52.6	41.1	31.9	21.2	38.8	40
Extreme Highest	62	65	77	89	92	99	102	97	98	91	77	66	102	20
Extreme Lowest	-18	-12	-4	17	25	36	41	40	29	17	9	-9	-18	20
Minimum 32 Degrees F or Less, Mean Number of Days	29	26	23	10	1	0	0	0	*	5	17	27	139	20
RELATIVE HUMIDITY														
Average Percentage (0700L)	79	78	79	78	79	81	82	87	88	85	83	81	82	20
Average Percentage (1300L)	70	64	62	55	54	55	52	55	57	56	66	72	60	20
CLOUD COVER														
Mean Number of Days with Clear Skies	4	5	5	7	7	8	9	9	8	8	4	3	77	20
Mean Number of Days with Cloudy Skies	20	16	19	16	14	11	9	10	12	14	19	21	181	20
PRECIPITATION														
Mean Amount (Inches)	1.99	1.64	2.52	3.02	2.86	3.45	2.94	3.44	2.42	1.92	2.27	2.74	31.21	40
Greatest Amount (Inches)	3.63	2.87	4.48	5.40	5.88	6.60	6.02	7.83	5.83	4.87	3.31	6.00	39.10	20
Least Amount (Inches)	0.27	0.15	0.92	0.92	1.15	2.12	0.59	1.06	0.43	0.35	0.79	0.46	21.01	20
Maximum in 24 hrs. (Inches)	1.72	1.23	1.28	1.97	2.87	2.62	3.19	3.21	2.07	2.11	1.52	3.71	3.71	20
Mean Amount of Snow (Inches)	9.7	8.1	6.6	1.6	*	0	0	0	0	*	3.7	10.8	40.5	36
Maximum Snowfall in 24 hrs. (Incnes)	7.8	10.3	9.2	4.2	*	0	0	0	0	*	5.6	19.2	19.2	20
Mean Number of Days with Snow (One Inch or More)	3	3	2	1	0	0	0	0	0	0	1	3	13	20
0.01 Inch or More, Mean Number of Days	13	11	13	12	11	11	9	9	10	9	11	14	134	20
WIND														
Direction (Percentage of Obs.)														
North	6.8	10.6	11.9	10.9	10.4	10.0	8.5	10.0	11.5	7.5	9.1	8.2	9.6	10
Northeast	6.3	10.4	11.9	12.3	12.1	9.7	8.7	7.9	9.4	6.2	6.6	7.8	9.1	10
East	7.4	9.3	10.4	12.2	12.5	7.9	6.6	6.6	7.8	6.6	5.8	9.2	8.6	10
Southeast	5.9	5.3	8.8	9.3	10.8	9.4	8.1	6.1	8.6	9.9	6.0	7.2	8.0	10
South	12.1	9.5	10.3	12.8	12.3	14.7	14.6	15.2	15.8	17.4	14.4	13.5	13.6	10
Southwest	24.3	16.9	12.5	13.3	13.2	22.0	21.9	22.7	17.7	20.8	22.0	19.9	18.9	10
West	25.0	21.3	18.0	17.0	16.6	15.5	19.0	17.9	16.7	18.2	21.9	20.6	18.9	10
Northwest	11.6	15.9	15.2	11.0	11.2	8.3	10.9	12.0	10.5	12.0	13.4	13.2	12.1	10
Calm	0.6	0.8	1.0	1.2	0.9	2.5	1.7	1.6	2.0	1.4	0.8	0.4	1.2	10
VISIBILITY														
Days with Dense Fog	3	2	3	1	1	1	1	2	1	3	2	3	22	20

MOUNT CLEMENS, MICHIGAN (42°36'N., 82°49'W.) Elevation 606 ft. (184.7m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1018.8	1018.0	1016.1	1015.1	1015.4	1014.7	1015.8	1016.5	1018.0	1018.2	1016.5	1018.2	1016.8	18
TEMPERATURE (DEGREES F)														
Mean	24.6	26.0	33.0	45.7	57.2	67.6	72.3	70.7	63.0	52.7	39.7	28.6	48.5	30
Mean Daily Maximum	31.2	33.0	41.5	55.4	67.1	77.6	82.2	80.4	72.6	62.2	46.6	34.4	57.2	29
Mean Daily Minimum	18.0	18.9	26.3	37.0	47.2	57.7	62.4	61.3	53.3	43.5	32.6	22.3	40.1	29
Extreme Highest	62	64	81	87	92	99	100	99	100	89	80	64	100	28
Extreme Lowest	-13	-8	-2	14	29	37	44	40	30	23	4	-4	-13	28
RELATIVE HUMIDITY														
Average Percentage (0700L)	80.2	80.0	80.0	78.2	76.5	78.3	78.6	82.8	84.4	84.5	82.2	81.0	80.6	29
Average Percentage (1300L)	73.0	69.5	65.2	59.1	57.1	58.1	54.9	57.5	59.0	59.8	67.3	72.7	62.8	29
PRECIPITATION														
Mean Amount (Inches)	1.59	1.83	2.30	2.74	3.07	2.89	2.18	2.76	2.16	2.12	2.03	1.96	27.63	26
Greatest Amount (Inches)	3.75	4.52	4.46	5.23	7.48	8.15	4.86	6.78	5.00	4.46	3.98	5.32		26
Least Amount (Inches)	0.19	0.34	0.53	0.40	0.84	0.22	0.50	0.37	0.37	0.30	0.74	0.13		26
Maximum in 24 hrs. (Inches)	1.30	2.62	1.85	1.89	3.22	3.36	2.59	2.60	2.06	2.46	1.29	2.31	3.36	26
Mean Amount of Snow (Inches)	7.8	6.8	5.1	0.7	*	0	0	*	0	*	2.8	6.3	29.4	19
Maximum Snowfall in 24 hrs. (Inches)	6.0	4.7	9.9	2.0	*	0	0	*	0	*	5.0	5.9	9.9	19
WIND														
Direction (Percentage of Obs.): at 0700L														
North	10.3	13.0	13.8	15.8	16.3	13.3	14.4	14.8	11.5	10.4	8.0	8.8	12.5	28-29
Northeast	6.9	6.8	9.7	10.4	10.0	10.3	8.8	6.3	6.7	5.9	4.2	4.1	7.5	28-29
East	3.9	4.5	7.0	7.9	6.6	6.2	4.7	4.3	5.9	4.7	4.8	3.9	5.4	28-29
Southeast	5.1	6.1	7.0	7.4	8.0	5.8	4.0	3.5	4.9	4.2	5.0	4.2	5.4	28-29
South	12.0	10.6	10.4	10.1	11.7	11.7	9.4	9.2	11.4	12.4	15.5	14.4	11.6	28-29
Southwest	20.1	14.8	13.7	12.9	14.1	16.1	15.1	16.9	16.3	18.3	23.0	22.9	17.0	28-29
West	17.4	17.5	14.4	13.2	12.0	12.0	14.0	12.0	12.1	13.5	17.2	18.8	14.5	28-29
Northwest	15.1	16.7	15.4	12.9	12.0	11.3	13.2	15.0	13.7	13.1	12.8	14.8	13.8	28-29
Calm	9.2	10.0	8.6	9.4	9.3	13.3	16.4	18.0	17.5	17.5	9.5	8.1	12.2	28-29
Direction (Percentage of Obs.): at 1600L														
North	10.8	12.8	14.2	12.6	11.2	8.6	8.5	10.4	11.8	11.2	8.6	9.3	10.8	28-29
Northeast	7.7	8.4	10.4	11.7	11.6	10.0	9.0	9.5	8.3	7.0	4.6	4.9	8.6	28-29
East	4.2	5.7	8.7	9.0	8.1	9.4	7.5	7.0	5.5	4.3	3.9	3.8	6.4	28-29
Southeast	6.5	8.1	11.4	14.9	17.1	18.8	19.2	19.1	18.0	15.3	8.1	6.7	13.6	28-29
South	14.3	12.6	12.5	13.9	17.7	19.0	22.3	21.7	21.9	21.0	19.9	15.9	17.7	28-29
Southwest	17.9	14.8	10.7	10.0	11.2	11.1	10.3	10.4	10.3	13.1	19.7	20.8	13.4	28-29
West	19.8	18.3	16.2	15.2	12.6	12.9	12.3	9.5	11.5	12.5	17.6	18.4	14.7	28-29
Northwest	15.6	16.0	14.4	11.8	9.2	9.0	8.8	9.8	10.9	12.6	14.2	15.7	12.3	28-29
Calm	3.2	3.3	1.5	0.9	1.3	1.2	2.1	2.6	1.8	3.0	3.4	4.5	2.4	28-29

ALPENA, MICHIGAN (45°04'N., 83°34'W.) Elevation 689 ft. (210.0m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1016.7	1017.0	1017.2	1015.3	1015.9	1015.6	1015.1	1015.3	1017.5	1015.4	1016.1	1016.9	1016.2	9
TEMPERATURE (DEGREES F)														
Mean	19.4	18.6	26.7	39.5	50.7	61.0	66.5	64.8	57.1	47.4	35.4	24.9	42.7	40
Mean Daily Maximum	26.7	27.0	34.9	48.0	60.4	70.9	76.5	74.4	65.6	55.7	41.6	30.9	51.1	40
Mean Daily Minimum	12.0	10.1	18.4	31.0	41.0	51.0	56.4	55.1	48.6	39.1	29.1	18.8	34.2	40
Extreme Highest	52	58	73	86	94	98	98	95	93	88	76	62	98	20
Extreme Lowest	-28	-25	-27	0	20	28	34	31	26	16	-1	-18	-28	20
Minimum 32 Degrees F or Less, Mean Number of Days	31	28	29	20	8	1	0	*	3	12	22	29	183	19
RELATIVE HUMIDITY														
Average Percentage (0700L)	78	76	79	79	76	80	83	88	90	85	83	82	82	19
Average Percentage (1300L)	69	64	60	53	50	53	53	57	61	60	69	73	60	19
CLOUD COVER														
Mean Number of Days with Clear Skies	3	5	7	7	8	8	8	10	6	6	2	2	72	19
Mean Number of Days with Cloudy Skies	20	16	16	15	13	11	9	10	14	17	21	23	185	19
PRECIPITATION														
Mean Amount (Inches)	1.82	1.53	1.94	2.24	2.92	3.07	2.71	2.97	3.14	2.55	2.39	1.94	29.22	40
Greatest Amount (Inches)	3.31	3.17	4.44	3.43	5.46	8.37	7.17	5.76	6.67	4.78	7.45	4.44	35.23	20
Least Amount (Inches)	0.16	0.27	0.64	1.18	1.05	1.12	0.91	0.92	1.00	0.61	0.78	0.61	23.98	20
Maximum in 24 hrs. (Inches)	1.83	1.24	1.33	1.20	2.50	2.65	3.15	3.18	3.02	1.57	1.93	1.63	3.18	20
Mean Amount of Snow (Inches)	22.0	15.3	13.8	3.2	0.3	0	0	0	*	0.7	9.0	21.8	86.1	40
Maximum Snowfall in 24 hrs. (Inches)	16.3	11.5	15.0	8.0	3.7	0	0	0	*	3.8	16.1	12.4	16.3	20
Mean Number of Days with Snow (One Inch or More)	6	5	4	1	*	0	0	0	0	*	2	7	26	19
0.01 Inch or More, Mean Number of Days	14	11	12	11	12	11	10	11	13	11	14	16	145	19
WIND														
Direction (Percentage of Obs.): at 0700L														
North	5.5	11.4	11.7	10.1	9.2	8.0	4.7	3.8	5.1	4.7	5.6	7.0	7.2	7-8
Northeast	3.8	6.0	7.9	8.4	8.0	7.5	4.8	5.1	8.0	3.4	5.1	3.3	5.9	7-8
East	4.4	3.7	8.7	9.2	7.4	6.1	4.8	3.7	5.5	5.2	3.9	2.9	5.5	7-8
Southeast	7.1	7.3	11.3	17.2	14.2	10.3	8.0	8.5	7.3	7.5	9.8	7.8	9.7	7-8
South	9.5	8.2	7.1	5.8	6.9	6.8	4.3	6.5	8.1	9.2	12.0	9.1	7.8	7-8
Southwest	29.3	16.7	13.9	12.4	18.5	19.5	19.3	29.5	26.7	28.6	23.7	29.9	22.3	7-8
West	23.1	25.7	20.0	15.8	16.0	24.4	31.9	25.5	25.0	24.4	23.3	22.9	23.2	7-8
Northwest	14.6	18.8	15.9	18.5	18.2	15.6	21.2	15.9	11.6	13.4	16.1	15.3	16.3	7-8
Calm	2.7	2.2	3.5	2.6	1.6	1.8	1.0	1.5	2.7	3.6	0.5	1.8	2.1	7-8
Direction (Percentage of Obs.): at 1600L														
North	9.1	14.9	16.4	13.7	11.2	9.3	10.3	11.5	7.0	9.3	6.3	9.6	10.7	7-8
Northeast	6.5	11.6	14.1	9.7	8.5	9.4	9.4	6.9	7.9	5.8	5.9	6.4	8.5	7-8
East	3.6	7.6	13.3	15.9	18.2	16.8	14.6	12.3	11.3	8.1	5.4	4.4	11.0	7-8
Southeast	7.2	11.5	18.6	21.3	25.3	22.1	25.6	22.4	20.8	15.3	14.1	10.0	17.9	7-8
South	10.3	4.9	3.8	3.7	2.9	2.6	4.2	4.8	8.3	6.5	10.7	9.4	6.0	7-8
Southwest	20.6	11.8	7.3	8.8	9.3	13.1	10.1	12.7	15.9	19.5	18.4	23.0	14.2	7-8
West	21.7	16.3	10.7	9.1	10.2	13.4	9.1	13.0	14.8	18.6	19.4	18.9	14.6	7-8
Northwest	20.1	21.4	15.8	17.6	14.4	13.3	16.7	16.4	13.5	16.9	19.6	17.7	17.0	7-8
Calm	0.9	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.5	0.0	0.2	0.6	0.2	7-8
VISIBILITY														
Days with Dense Fog	1	1	3	2	2	3	2	3	3	3	2	1	26	18

MUSKEGON, MICHIGAN (43°10'N., 86°15'W.) Elevation 625 ft. (190.5m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1018.1	1017.1	1016.2	1015.2	1014.7	1014.2	1015.7	1016.4	1017.1	1017.7	1016.3	1016.9	1016.3	20-21
TEMPERATURE (DEGREES F)														
Mean	23.7	24.4	32.5	45.2	55.6	65.5	70.0	68.8	61.4	51.3	39.1	28.4	47.2	40
Mean Daily Maximum	29.8	31.3	40.7	54.8	66.1	76.1	80.3	79.0	71.1	60.4	45.6	34.1	55.8	40
Mean Daily Minimum	17.6	17.4	24.2	35.6	45.0	54.8	59.6	58.5	51.6	42.2	32.6	22.6	38.5	40
Extreme Highest	63	62	77	86	93	97	95	99	95	83	76	63	99	39
Extreme Lowest	-13	-14	-10	12	22	31	40	40	28	21	-14	-15	-15	39
Minimum 32 Degrees F or Less, Mean Number of Days	29	27	24	12	2	*	0	0	*	5	15	27	141	18
RELATIVE HUMIDITY														
Average Percentage (0700L)	80	80	79	77	75	80	83	87	88	83	80	81	81	18
Average Percentage (1300L)	75	69	64	56	54	57	59	60	63	64	70	76	64	18
CLOUD COVER														
Mean Number of Days with Clear Skies	2	3	5	7	8	9	12	11	9	8	3	2	79	36
Mean Number of Days with Cloudy Skies	26	20	19	15	14	11	9	9	11	14	23	26	197	36
PRECIPITATION														
Mean Amount (Inches)	2.34	1.75	2.56	3.08	2.75	2.64	2.39	2.91	3.12	2.59	2.92	2.56	31.61	40
Greatest Amount (Inches)	4.30	3.07	6.59	7.12	5.26	5.46	6.63	9.88	8.54	6.56	5.63	5.42	40.19	39
Least Amount (Inches)	0.45	0.43	0.55	0.86	1.01	0.19	0.47	0.11	0.76	0.33	1.11	0.91	23.12	39
Maximum in 24 hrs. (Inches)	1.69	1.39	2.36	2.31	2.16	3.19	2.54	3.72	3.61	3.21	2.06	1.82	3.72	39
Mean Amount of Snow (Inches)	31.0	17.0	12.4	2.6	*	0	0	0	*	0.5	9.7	23.4	96.7	40
Maximum Snowfall in 24 hrs. (Inches)	21.8	17.5	9.9	11.0	0.4	0	0	0	*	4.7	9.1	20.1	21.8	39
Mean Number of Days with Snow (One Inch or More)	10	6	4	1	0	0	0	0	0	*	3	8	32	38
0.01 Inch or More, Mean Number of Days	17	14	14	12	11	10	8	8	10	10	14	16	144	38
WIND														
Direction (Percentage of Obs.)														
North	10.4	15.5	14.9	10.9	7.8	9.3	8.6	9.3	9.7	8.9	13.0	11.8	10.8	10
Northeast	4.5	7.3	8.3	6.5	5.9	5.2	5.0	4.3	6.1	4.4	5.8	5.9	5.7	10
East	13.3	15.0	16.3	16.1	15.1	9.7	8.3	8.4	13.1	12.9	10.3	16.1	12.9	10
Southeast	11.8	9.4	10.7	11.8	11.4	8.6	7.7	8.4	13.3	15.2	13.6	15.1	11.4	10
South	9.5	9.1	10.7	12.1	12.7	16.5	15.1	16.1	15.5	16.6	10.8	8.7	12.8	10
Southwest	11.7	9.7	9.0	12.7	14.6	20.7	18.6	18.0	11.1	12.6	11.1	10.4	13.4	10
West	19.4	12.3	11.4	13.1	15.9	13.4	15.6	12.7	10.6	13.1	17.7	15.8	14.3	10
Northwest	17.2	18.5	16.1	13.1	12.3	10.2	11.9	11.3	12.1	12.2	15.4	13.5	13.6	10
Calm	2.2	3.2	2.6	3.7	4.3	6.5	9.2	11.5	8.5	4.1	2.3	2.7	5.1	10
VISIBILITY														
Days with Dense Fog	2	2	2	2	2	2	2	2	1	3	2	1	23	35

CHICAGO, ILLINOIS (41°47'N., 87°45'W.) Elevation 607 ft. (185.0m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1019.2	1018.6	1016.3	1015.5	1014.8	1014.0	1015.3	1016.0	1017.2	1018.0	1017.6	1019.1	1016.8	30
TEMPERATURE (DEGREES F)														
Mean	24.4	27.1	36.4	47.9	58.4	68.4	73.8	72.5	65.6	54.4	40.4	29.3	49.9	40
Mean Daily Maximum	31.4	34.0	43.6	55.9	67.0	76.9	81.8	80.0	73.5	62.3	47.3	35.6	57.4	40
Mean Daily Minimum	17.4	20.1	29.2	39.8	49.7	59.9	65.8	65.0	57.7	46.5	33.5	22.9	42.3	40
Extreme Highest	67	75	83	88	95	104	103	101	101	94	81	71	104	36
Extreme Lowest	-19	-15	-7	16	29	35	46	43	34	20	-2	-14	-19	36
Minimum 32 Degrees F or Less, Mean Number of Days	28	25	20	5	1	0	0	0	0	2	14	25	120	15
RELATIVE HUMIDITY														
Average Percentage (0700L)	72	72	74	73	73	74	77	81	81	78	78	79	76	15
Average Percentage (1300L)	65	62	60	56	53	54	55	56	56	55	64	71	59	15
CLOUD COVER														
Mean Number of Days with Clear Skies	7	7	5	6	8	8	10	10	10	11	6	6	94	36
Mean Number of Days with Cloudy Skies	18	16	17	15	14	12	9	9	10	12	17	19	168	36
PRECIPITATION														
Mean Amount (Inches)	1.92	1.79	2.72	3.15	3.47	3.73	3.44	3.18	3.17	2.57	2.30	2.11	33.55	40
Greatest Amount (Inches)	4.09	3.35	5.37	8.33	7.59	8.89	8.98	9.68	14.17	12.06	5.05	6.67	46.09	36
Least Amount (Inches)	0.26	0.25	0.33	0.45	0.78	0.78	1.33	0.80	0.46	0.20	0.55	0.30	22.22	36
Maximum in 24 hrs. (Inches)	2.86	1.54	2.50	4.08	3.63	4.64	6.24	3.83	4.16	5.63	2.93	2.79	6.24	36
Mean Amount of Snow (Inches)	10.5	8.6	7.4	1.4	*	0	0	0	0	0.3	3.0	11.4	42.6	40
Maximum Snowfall in 24 hrs. (Inches)	19.8	9.3	14.3	10.7	0.2	0	0	0	0	4.4	8.6	12.5	19.8	36
Mean Number of Days with Snow (One Inch or More)	3	3	2	*	0	0	0	0	0	*	1	3	13	36
0.01 Inch or More, Mean Number of Days	11	10	13	13	12	10	9	8	9	8	10	11	124	36
WIND														
Direction (Percentage of Obs.)														
North	7.1	10.6	13.2	11.3	11.3	11.5	8.8	7.5	10.1	7.0	8.3	6.6	9.4	10
Northeast	3.8	8.7	13.5	13.1	14.1	11.3	10.6	9.0	9.1	4.5	4.8	4.6	8.9	10
East	6.0	8.8	9.9	13.5	13.1	10.5	10.7	10.7	9.6	5.0	4.6	6.7	9.1	10
Southeast	6.7	5.4	6.3	7.9	7.9	5.9	4.6	5.8	8.2	8.2	6.0	8.4	6.8	10
South	19.8	16.5	16.8	21.3	19.1	24.9	21.3	24.7	26.1	31.3	22.9	21.6	22.2	10
Southwest	18.1	12.7	11.1	9.6	13.5	17.8	19.0	18.9	12.8	16.1	16.3	15.0	15.1	10
West	22.8	19.0	13.8	13.7	12.1	9.5	10.9	10.8	10.1	14.9	20.7	19.9	14.8	10
Northwest	13.0	16.2	13.5	7.2	5.8	4.9	8.3	7.1	9.1	9.2	13.4	13.0	10.1	10
Calm	2.7	2.1	1.9	2.4	3.1	3.7	5.8	5.5	4.9	3.8	3.0	4.2	3.6	10
VISIBILITY														
Days with Dense Fog	2	1	1	1	1	*	*	1	*	1	1	2	12	36

MILWAUKEE, WISCONSIN (42°57'N., 87°54'W.) Elevation 672 ft. (204.8m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1019.4	1018.5	1016.6	1015.0	1015.7	1014.7	1015.9	1016.3	1017.5	1017.4	1016.2	1016.0	1016.8	24
TEMPERATURE (DEGREES F)														
Mean	20.7	23.3	32.7	44.3	54.4	64.5	70.8	69.7	62.6	51.4	37.6	25.9	46.5	40
Mean Daily Maximum	27.9	30.4	39.6	52.3	63.4	73.6	79.3	77.8	70.7	59.2	44.4	32.4	54.3	40
Mean Daily Minimum	13.4	16.1	25.7	36.3	45.4	55.4	62.2	61.5	54.4	43.5	30.7	19.3	38.7	40
Extreme Highest	62	65	81	85	92	99	101	100	98	89	77	63	101	38
Extreme Lowest	-24	-19	-10	13	21	33	40	44	28	21	-5	-15	-24	38
Minimum 32 Degrees F or Less, Mean Number of Days	30	27	24	11	2	0	0	0	*	5	19	28	145	18
RELATIVE HUMIDITY														
Average Percentage (0700L)	75	76	79	79	79	82	83	87	87	82	81	80	81	18
Average Percentage (1300L)	68	67	66	62	61	62	61	62	63	63	67	73	65	18
CLOUD COVER														
Mean Number of Days with Clear Skies	7	7	6	7	7	8	11	11	10	10	6	6	96	38
Mean Number of Days with Cloudy Skies	18	15	17	15	14	12	9	9	11	12	18	19	169	38
PRECIPITATION														
Mean Amount (Inches)	1.82	1.56	2.49	2.81	3.18	3.54	2.95	2.81	3.16	2.28	1.99	1.78	30.37	40
Greatest Amount (Inches)	4.04	3.10	6.93	7.31	5.27	8.28	7.66	7.07	9.87	6.42	3.37	4.34	40.74	38
Least Amount (Inches)	0.31	0.05	0.31	0.81	0.90	0.85	0.95	0.46	0.30	0.15	0.62	0.29	19.10	38
Maximum in 24 hrs. (Inches)	1.71	1.67	2.57	3.11	3.11	3.13	4.35	4.05	5.28	2.60	2.18	1.93	5.28	38
Mean Amount of Snow (Inches)	12.5	9.1	9.4	1.7	*	0	0	0	*	0.1	3.2	10.6	46.6	40
Maximum Snowfall in 24 hrs. (Inches)	12.8	16.7	11.2	11.6	0.4	0	0	0	*	4.0	10.6	12.4	16.7	38
Mean Number of Days with Snow (One Inch or More)	3	3	3	*	0	0	0	0	0	*	1	3	14	38
0.01 Inch or More, Mean Number of Days	11	9	12	12	12	11	10	9	9	9	10	11	124	38
WIND														
Direction (Percentage of Obs.)														
North	6.9	11.7	16.1	16.5	15.7	15.2	11.2	10.7	10.5	8.5	10.3	7.4	11.7	10
Northeast	3.4	7.1	10.8	12.8	14.8	9.4	8.9	7.8	7.8	5.1	5.0	4.4	8.1	10
East	3.9	6.7	7.1	10.7	8.6	7.0	7.3	7.8	7.6	4.2	3.4	5.7	6.7	10
Southeast	6.2	4.6	8.9	11.5	13.3	12.0	9.7	9.9	11.0	10.7	5.5	6.0	9.1	10
South	12.4	11.8	12.5	13.2	11.8	16.1	15.6	15.9	19.2	20.5	15.6	14.6	14.9	10
Southwest	15.9	12.7	10.2	10.4	11.7	17.5	18.5	21.4	14.4	17.6	15.6	15.9	15.2	10
West	32.1	22.6	16.2	13.9	15.1	15.1	17.4	16.3	15.5	20.2	25.7	25.4	19.6	10
Northwest	18.3	21.2	16.8	8.9	6.8	5.3	8.5	7.1	10.2	11.0	17.0	19.1	12.5	10
Calm	0.9	1.6	1.4	2.1	2.2	2.4	2.9	3.1	3.8	2.2	1.9	1.5	2.2	10
VISIBILITY														
Days with Dense Fog	2	2	3	3	3	2	1	2	1	2	2	2	27	38

GREEN BAY, WISCONSIN (44°29'N., 88°08'W.) Elevation 682 ft. (207.9m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1018.6	1017.8	1016.6	1015.1	1014.5	1013.7	1015.2	1016.0	1016.8	1016.9	1016.2	1017.0	1016.2	21
TEMPERATURE (DEGREES F)														
Mean	15.9	18.0	29.1	43.3	55.0	65.2	70.3	68.0	60.2	49.0	34.5	21.9	44.2	40
Mean Daily Maximum	23.8	26.3	37.1	52.5	65.7	75.5	80.7	78.2	69.9	57.9	41.5	28.8	53.2	40
Mean Daily Minimum	7.9	9.6	21.1	34.1	44.3	54.9	59.8	57.7	50.4	40.0	27.5	14.9	35.2	40
Extreme Highest	50	54	73	87	91	97	99	99	95	88	72	62	99	29
Extreme Lowest	-31	-26	-29	7	21	32	40	38	24	15	-9	-21	-31	29
Minimum 32 Degrees F or Less, Mean Number of Days	31	28	27	14	3	0	0	0	1	8	21	29	163	17
RELATIVE HUMIDITY														
Average Percentage (0700L)	76	77	80	78	78	82	85	88	88	84	83	81	82	17
Average Percentage (1300L)	70	67	65	58	55	58	57	59	62	61	69	73	63	17
CLOUD COVER														
Mean Number of Days with Clear Skies	8	7	7	7	7	8	9	9	8	8	5	6	89	29
Mean Number of Days with Cloudy Skies	17	14	16	15	14	12	10	11	12	15	18	19	173	29
PRECIPITATION														
Mean Amount (Inches)	1.34	1.30	1.92	2.59	3.18	3.42	3.09	2.93	3.16	2.09	1.92	1.44	28.38	40
Greatest Amount (Inches)	2.64	3.56	4.68	5.52	8.21	8.47	6.50	9.04	7.80	5.00	3.52	3.15	35.47	29
Least Amount (Inches)	0.31	0.04	0.31	0.98	0.82	0.31	1.78	0.90	0.28	*	0.16	0.10	17.85	29
Maximum in 24 hrs. (Inches)	1.05	1.78	1.25	1.75	3.28	2.65	2.95	4.60	2.99	3.68	1.53	1.55	4.60	29
Mean Amount of Snow (Inches)	10.2	8.5	9.1	2.1	0.1	0	0	0	*	0.1	4.2	10.5	44.8	40
Maximum Snowfall in 24 hrs. (Inches)	8.6	9.2	10.1	10.2	2.2	0	0	0	*	1.6	8.2	7.6	10.2	29
Mean Number of Days with Snow (One Inch or More)	4	3	3	1	*	0	0	0	0	*	1	3	14	29
0.01 Inch or More, Mean Number of Days	10	8	11	11	11	11	10	10	10	8	8	11	121	29
WIND														
Direction (Percentage of Obs.)														
North	8.9	15.8	15.3	12.7	10.5	8.9	9.5	12.3	12.9	9.4	15.0	12.5	11.9	10
Northeast	7.7	12.1	15.4	17.1	14.8	11.7	8.6	7.8	6.9	6.2	6.9	9.5	10.4	10
East	4.4	4.7	7.2	11.0	12.5	8.3	5.7	6.6	7.0	6.0	5.6	6.2	7.1	10
Southeast	4.6	2.6	7.2	8.1	11.5	8.0	6.1	6.2	9.5	9.2	5.3	4.4	7.0	10
South	10.4	10.0	11.3	14.0	12.8	17.5	17.2	17.3	16.9	19.9	13.3	12.3	14.4	10
Southwest	18.4	16.1	10.8	11.5	11.5	16.8	18.9	19.4	14.2	16.5	12.8	16.6	15.3	10
West	30.0	20.3	17.0	13.4	14.4	17.3	19.2	14.2	16.7	17.4	21.6	22.1	18.6	10
Northwest	13.1	15.1	12.9	9.4	8.8	8.2	9.7	9.7	10.8	12.1	16.6	13.7	11.7	10
Calm	2.5	3.3	2.9	2.8	3.2	3.3	5.1	6.5	5.1	3.3	2.9	2.7	3.6	10
VISIBILITY														
Days with Dense Fog	2	3	3	2	2	2	1	2	2	3	3	2	26	29

SAULT STE. MARIE, MICHIGAN (46°26'N., 84°22 W.) Elevation 721 ft. (219.8m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1017.3	1017.4	1016.3	1015.9	1015.2	1013.9	1015.0	1016.0	1016.8	1017.0	1015.3	1016.7	1016.1	30
TEMPERATURE (DEGREES F)														
Mean	14.1	13.7	23.3	37.6	49.2	58.7	63.8	62.9	55.7	45.4	32.6	20.5	39.8	40
Mean Daily Maximum	21.9	22.5	31.9	46.3	59.6	69.9	74.7	72.7	64.5	53.0	38.5	27.0	48.5	40
Mean Daily Minimum	6.3	4.8	14.7	28.9	38.8	47.4	52.8	53.0	46.9	37.7	26.7	13.9	31.0	40
Extreme Highest	45	45	75	83	89	92	97	98	95	80	66	59	98	38
Extreme Lowest	-30	-28	-24	1	18	28	36	32	25	16	-10	-24	-30	38
Minimum 32 Degrees F or Less, Mean Number of Days	31	28	29	22	7	*	0	*	1	9	22	30	179	37
RELATIVE HUMIDITY														
Average Percentage (0700L)	82	82	83	80	79	85	88	92	92	89	87	84	85	37
Average Percentage (1300L)	76	73	68	61	56	62	62	63	67	67	76	78	67	37
CLOUD COVER														
Mean Number of Days with Clear Skies	3	5	7	7	7	7	9	8	5	5	2	3	68	37
Mean Number of Days with Cloudy Skies	22	18	18	16	15	13	12	12	17	19	24	23	209	37
PRECIPITATION														
Mean Amount (Inches)	2.07	1.52	1.83	2.16	2.80	2.97	2.71	2.99	3.64	2.94	3.10	2.33	31.06	40
Greatest Amount (Inches)	4.37	3.74	4.97	5.16	7.41	7.35	6.04	9.48	7.78	6.29	5.70	4.43	42.96	37
Least Amount (Inches)	0.51	0.54	0.67	0.60	1.23	0.63	0.93	0.50	0.86	0.16	0.87	0.73	25.51	37
Maximum in 24 hrs. (Inches)	1.37	1.11	1.81	2.67	5.10	5.06	2.79	5.92	2.25	2.06	1.83	1.32	5.92	37
Mean Amount of Snow (Inches)	27.0	19.4	15.1	4.8	0.6	*	0	0	0.2	2.3	15.1	27.0	111.5	40
Maximum Snowfall in 24 hrs. (Inches)	14.2	12.6	11.9	8.3	4.6	*	0	0	2.7	10.1	14.3	9.9	14.3	37
Mean Number of Days with Snow (One Inch or More)	9	6	4	2	*	0	0	0	*	1	5	9	37	37
0.01 Inch or More, Mean Number of Days	19	15	13	11	11	12	10	11	14	13	17	19	165	37
WIND														
Direction (Percentage of Obs.): at 0700L														
North	8.9	9.3	8.2	8.5	6.3	3.7	3.0	7.4	6.3	9.5	9.4	12.0	7.7	24
Northeast	10.9	12.2	16.7	10.8	11.2	8.3	10.5	12.0	13.5	11.6	10.1	10.8	11.6	24
East	31.6	29.8	31.3	31.4	29.6	30.0	26.6	28.2	28.8	29.4	22.9	27.0	28.9	24
Southeast	10.8	7.7	6.8	9.5	11.6	10.8	8.9	8.0	10.5	11.1	14.6	12.0	10.2	24
South	4.0	3.0	1.9	2.7	3.3	3.6	4.1	3.0	4.2	5.2	7.9	5.1	4.0	24
Southwest	8.5	7.1	4.6	4.7	6.3	6.9	6.2	6.7	10.0	9.3	10.3	10.6	7.6	24
West	9.6	10.5	11.7	13.5	14.1	17.4	18.5	11.8	9.3	9.5	9.1	9.8	12.1	24
Northwest	13.6	15.9	14.6	15.1	13.4	14.2	15.2	15.0	11.3	10.9	12.6	10.0	13.5	24
Calm	2.1	4.5	4.2	3.8	4.2	5.1	7.0	7.8	6.1	3.5	3.1	2.7	4.5	24
Direction (Percentage of Obs.): at 1600L														
North	5.0	3.2	3.7	2.8	2.5	1.9	1.8	2.6	2.9	4.4	7.3	7.8	3.8	24
Northeast	2.5	2.6	3.3	3.5	2.8	1.9	1.5	2.7	3.0	3.8	4.9	4.4	3.1	24
East	17.2	11.6	12.5	12.1	8.5	9.3	5.8	6.8	8.7	10.6	12.4	16.5	11.0	24
Southeast	16.1	15.3	14.0	16.6	16.4	15.3	12.1	11.7	17.2	16.8	18.1	15.4	15.4	24
South	8.3	7.2	7.6	4.9	5.1	6.8	6.3	6.1	8.0	8.3	9.0	8.9	7.2	24
Southwest	12.1	9.1	7.4	8.7	11.0	14.2	16.3	14.4	15.1	14.3	11.7	13.1	12.3	24
West	14.1	18.9	17.2	15.4	17.2	16.2	19.9	18.4	14.1	14.8	12.7	12.6	16.0	24
Northwest	21.7	30.9	33.8	35.9	36.4	33.8	36.0	36.7	30.7	26.4	22.6	19.5	30.4	24
Calm	3.0	1.2	0.5	0.1	0.1	0.5	0.3	0.6	0.3	0.6	1.3	1.8	0.9	24
VISIBILITY														
Days with Dense Fog	2	2	3	3	3	4	5	6	6	5	3	3	46	37

DULUTH, MINNESOTA (46°50'N., 92°11'W.) Elevation 1428 ft. (435.3m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1019.1	1018.6	1017.1	1015.0	1015.0	1013.5	1015.1	1015.7	1016.1	1015.7	1015.4	1017.3	1016.1	24
TEMPERATURE (DEGREES F)														
Mean	8.3	12.3	24.0	38.1	49.1	58.5	65.1	63.7	55.1	44.5	28.8	14.7	38.5	40
Mean Daily Maximum	17.0	21.4	32.4	46.8	59.0	68.8	75.3	73.3	64.1	52.8	35.6	22.3	47.4	40
Mean Daily Minimum	-0.4	3.1	15.6	29.3	39.1	48.1	54.9	54.1	46.1	36.2	21.9	7.0	29.6	40
Extreme Highest	52	55	78	88	90	93	97	97	95	86	70	55	97	37
Extreme Lowest	-39	-32	-28	-5	17	27	36	33	22	8	-23	-33	-39	37
Minimum 32 Degrees F or Less, Mean Number of Days	31	28	29	21	5	*	0	0	3	11	25	31	185	17
RELATIVE HUMIDITY														
Average Percentage (0700L)	75	75	77	77	76	81	84	87	87	81	80	78	80	17
Average Percentage (1300L)	69	62	61	55	53	59	59	63	68	65	72	74	63	17
CLOUD COVER														
Mean Number of Days with Clear Skies	7	8	7	6	6	5	7	8	6	7	4	6	77	30
Mean Number of Days with Cloudy Skies	17	15	17	16	16	14	10	11	15	16	20	19	186	30
PRECIPITATION														
Mean Amount (Inches)	1.13	0.95	1.66	2.17	3.09	3.96	3.71	3.51	3.18	2.19	1.66	1.15	28.36	40
Greatest Amount (Inches)	4.70	2.37	5.12	5.84	7.67	7.51	8.48	10.31	6.58	7.53	4.19	3.70	40.08	37
Least Amount (Inches)	0.14	0.22	0.22	0.59	0.15	1.19	0.97	0.71	0.19	0.13	0.19	0.16	20.67	37
Maximum in 24 hrs. (Inches)	1.74	1.38	2.38	2.27	2.28	4.05	3.40	5.79	3.77	2.90	2.64	2.12	5.79	29
Mean Amount of Snow (Inches)	17.0	11.8	13.9	6.8	0.9	*	0	*	*	1.1	10.2	15.9	77.6	40
Maximum Snowfall in 24 hrs. (Inches)	13.4	17.0	19.4	11.2	4.3	0.2	0	*	0.2	7.9	15.7	25.4	25.4	35
Mean Number of Days with Snow (One Inch or More)	5	4	4	2	*	0	0	0	0	*	3	4	22	35
0.01 Inch or More, Mean Number of Days	12	10	11	11	13	13	11	11	11	9	11	12	134	37
WIND														
Direction (Percentage of Obs.)														
North	9.4	13.9	13.1	9.9	10.3	5.8	5.8	6.7	6.5	7.2	12.8	10.0	9.2	10
Northeast	1.8	3.2	3.3	6.2	6.5	3.7	2.5	3.2	2.2	2.6	4.8	2.9	3.6	10
East	9.0	14.0	21.1	28.5	30.8	25.5	16.7	18.6	15.5	17.0	11.5	12.0	18.4	10
Southeast	7.7	5.9	8.5	8.2	10.9	12.2	8.7	10.6	11.3	11.1	8.4	9.4	9.4	10
South	7.4	7.1	6.0	7.6	4.8	8.9	10.8	11.3	13.2	12.8	8.3	10.4	9.0	10
Southwest	10.7	9.6	7.6	8.2	6.5	9.7	11.8	13.1	10.8	11.5	10.3	10.7	10.1	10
West	22.7	17.0	13.6	12.1	13.1	18.0	21.6	17.6	18.6	17.0	19.4	17.7	17.4	10
Northwest	26.9	24.0	20.4	15.1	13.5	11.9	16.2	12.4	16.0	17.7	22.0	22.1	18.1	10
Calm	4.4	5.3	6.0	4.2	3.6	4.3	5.9	6.5	5.9	3.1	3.5	4.8	4.8	10
VISIBILITY														
Days with Dense Fog	3	2	3	4	6	7	5	7	6	5	4	3	54	30

ATLANTIC OCEAN DISTANCES FOR DEEP-DRAFT VESSELS
MONTREAL, CANADA, TO PANAMA CANAL ZONE

Figure at intersection of columns opposite ports in question is the nautical mileage between the two. Example: New York, N. Y., is 1399 nautical miles from San Juan, P. R.

MONTREAL, CANADA* 45°30.2'N., 73°33.0'W.	Cabot Strait 47°07.0'N., 60°17.0'W.	Gut of Canso (Lock) 45°39.0'N., 61°25.0'W.	Portland, Maine 43°39.4'N., 70°14.7'W.	Boston, Mass. 42°22.0'N., 71°03.0'W.	NANTUCKET SHOALS 40°30.0'N., 69°25.0'W.	NEW YORK, N. Y. 40°42.0'N., 74°01.0'W.	Philadelphia, Pa. 39°56.8'N., 75°08.3'W.	Baltimore, Md. 39°16.0'N., 76°34.5'W.	CHESAPEAKE BAY ENT. 36°56.3'N., 75°58.6'W.	Norfolk, Va. 36°50.9'N., 76°17.9'W.	DIAMOND SHOALS 35°08.0'N., 75°15.0'W.	Wilmington, N. C. 34°14.0'N., 77°57.0'W.	Charleston, S. C. 32°47.2'N., 79°55.2'W.	Savannah, Ga. 32°05.0'N., 81°05.7'W.	Jacksonville, Fla. 30°19.2'N., 81°39.0'W.	Key West, Fla. 24°33.7'N., 81°48.5'W.	STRAITS OF FLORIDA 24°25.0'N., 83°00.0'W.	Tampa, Fla. 27°56.5'N., 82°26.7'W.	Pensacola, Fla. 30°24.0'N., 87°13.0'W.	Mobile, Ala. 30°42.5'N., 88°02.5'W.	NEW ORLEANS, La. (via SW Pass) 29°57.0'N., 90°03.7'W.	Port Arthur, Tex. 29°49.5'N., 93°57.6'W.	Galveston, Tex. 29°19.0'N., 94°47.0'W.	Corpus Christi, Tex. 27°48.8'N., 97°24.0'W.	San Juan, P. R. 18°27.8'N., 66°06.7'W.	YUCATAN CHANNEL 21°50.0'N., 85°03.0'W.	Panama Canal (Atlantic Ent.) 9°23.5'N., 79°55.3'W.	PANAMA CANAL (Pacific Ent.) 8°53.0'N., 79°31.0'W.
681																												
717	120																											
1276	595	484																										
1318	637	526	100																									
1311	630	519	203	163																								
1534	853	742	426	386	223																							
1682	1001	890	575	535	372	240																						
1838	1157	1046	734	694	531	417	392																					
1689	1008	896	584	544	381	267	242	150																				
1716	1035	923	611	571	408	294	269	173	27																			
1729	1048	936	628	588	425	345	322	267	117	144																		
1948	1267	1155	847	807	644	564	541	486	336	363	219																	
2014	1333	1221	913	873	710	630	607	552	402	429	285	151																
2088	1407	1295	987	947	784	704	681	626	476	503	359	227	102															
2172	1491	1379	1071	1031	868	788	765	710	560	587	443	315	197	145														
2479	1798	1690	1387	1347	1184	1109	1086	1031	881	908	764	667	572	543	462													
2540	1859	1751	1448	1408	1245	1170	1147	1092	942	969	825	728	633	604	523	73												
2772	2091	1983	1680	1640	1477	1402	1379	1324	1174	1201	1057	960	865	836	755	305	232											
2977	2296	2188	1885	1845	1682	1607	1584	1529	1379	1406	1262	1165	1070	1041	960	510	437	347										
3011	2330	2222	1919	1879	1716	1641	1618	1563	1413	1440	1296	1199	1104	1075	994	544	471	389	89									
3080	2399	2291	1988	1948	1785	1710	1687	1632	1482	1509	1365	1268	1173	1144	1063	613	540	502	288	269								
3240	2559	2451	2148	2108	1945	1870	1847	1792	1642	1669	1525	1428	1333	1304	1223	773	700	697	504	491	441							
3242	2561	2453	2150	2110	1947	1872	1849	1794	1644	1671	1527	1430	1335	1306	1225	775	702	703	509	496	446	89						
3347	2666	2558	2255	2215	2052	1977	1954	1899	1749	1776	1632	1535	1440	1411	1330	880	807	810	618	605	555	249	207					
2445	1764	1669	1531	1486	1334	1399	1395	1375	1225	1252	1114	1153	1138	1156	1121	966	1017	1249	1448	1448	1557	1717	1719	1824				
2730	2049	1937	1629	1589	1426	1346	1323	1268	1118	1145	1001	904	809	780	699	251	192	404	533	562	587	691	696	769	1111			
3203	2522	2419	2189	2149	1986	1972	1955	1904	1754	1781	1637	1609	1563	1564	1513	1060	1001	1213	1342	1371	1396	1487	1493	1549	990	809		
3249	2568	2465	2235	2195	2032	2018	2001	1950	1800	1827	1683	1655	1609	1610	1559	1106	1047	1259	1388	1417	1442	1533	1539	1595	1036	855	46	

*Quebec, Canada - SUBTRACT 139 miles.

All tabular distances are by outside routes which can be used by the deepest-draft vessel that the listed ports can accommodate. Lighter-draft vessels can save considerable mileage by transiting Canso Lock (Canada), the Cape Cod Canal (Massachusetts), and the Chesapeake and Delaware Canal (Delaware-Maryland); see the detailed tables. Gulf of Mexico distances are through the Shipping Safety Fairways, recomputed in 1970 to conform with latest fairway revisions.

Table 33--DISTANCES BETWEEN POINTS ON GREAT LAKES (statute miles)

		36 Montreal	35 Ogdensburg	34 Kingston	33 Toronto	32 Oswego	31 Rochester	30 Port Colborne	29 Buffalo	28 Erie	27 Conneaut	26 Ashtabula	25 Fairport	24 Cleveland	23 Lorain	22 Toledo	21 Detroit	20 Port Huron	19 Midland	18 Collingwood	17 Goderich	16 Bay City	15 Alpena	14 Ludington	13 Muskegon	12 Gary	11 Chicago	10 Milwaukee	9 Green Bay	8 Escanaba	7 Sault Ste. Marie	6 Marquette	5 Houghton	4 Ashland	3 Duluth	2 Two Harbors
1	Thunder Bay (Port Arthur), Canada	1222	1096	1034	903	1016	965	848	864	795	768	754	729	711	694	658	604	542	539	531	506	505	410	536	587	699	686	621	560	492	273	171	116	164	105	172
2	Two Harbors, Minn.	1320	1194	1132	1001	1114	1063	946	963	893	866	852	828	809	792	756	702	640	638	630	604	603	508	634	685	797	785	720	659	590	371	239	157	71	26	
3	Duluth, Minn.	1344	1218	1156	1025	1138	1087	970	988	917	890	876	851	833	816	781	726	664	661	653	628	627	532	657	709	820	808	743	682	614	394	261	179	93		
4	Ashland, Wis.	1298	1172	1110	970	1092	1041	924	941	871	844	830	806	788	771	734	680	618	616	608	583	581	486	612	663	775	763	698	637	568	349	213	131			
5	Houghton, Mich.	1170	1044	982	851	964	913	796	813	743	716	702	678	659	643	606	552	490	488	480	455	453	358	484	535	647	635	570	509	440	221	84				
6	Marquette, Mich.	1109	983	921	790	903	852	735	751	682	655	641	616	598	581	545	491	429	426	418	393	391	297	422	474	585	573	508	447	378	159					
7	Sault Ste. Marie, Mich. (a)	949	823	761	630	743	692	575	592	522	495	481	457	438	422	385	331	269	267	259	234	232	137	263	314	426	414	349	288	219						
8	Escanaba, Mich.	1056	930	868	737	850	799	682	699	629	602	588	564	545	528	492	438	376	384	376	340	339	244	130	181	288	274	201	101							
9	Green Bay, Wis.	1125	999	937	806	919	868	751	767	698	671	657	632	614	597	561	507	445	452	444	409	407	313	123	171	272	255	180								
10	Milwaukee, Wis.	1186	1060	998	867	980	929	812	828	759	732	718	693	675	658	622	568	506	513	505	470	468	374	97	80	103	85									
11	Chicago, Ill.	1251	1125	1063	932	1045	994	877	893	824	797	783	758	740	723	688	633	571	578	570	535	534	439	156	114	25										
12	Gary, Ind.	1263	1137	1075	944	1057	1006	889	905	836	809	795	770	752	735	699	645	583	590	582	547	546	451	167	121											
13	Muskegon, Mich.	1151	1025	963	832	945	894	777	794	724	697	683	659	640	623	587	533	471	479	471	435	434	339	56												
14	Ludington, Mich.	1100	974	912	781	894	843	726	742	673	646	632	607	589	572	536	482	420	427	419	384	383	288													
15	Alpena, Mich.	837	711	649	518	631	580	463	479	410	383	369	344	326	309	273	219	157	103	185	124	116														
16	Bay City, Mich.	842	716	654	523	636	585	468	484	415	388	374	349	331	314	278	224	162	265	257	137															
17	Goderich, Canada	745	619	557	426	539	488	371	387	318	291	277	252	234	217	181	127	65	211	207																
18	Collingwood, Canada	938	812	750	619	732	681	564	580	511	484	470	446	427	410	374	320	258	55																	
19	Midland, Canada	946	820	758	627	740	689	572	588	519	492	478	453	435	418	382	328	206																		
20	Port Huron, Mich. (b)	660	554	492	361	474	423	306	322	253	226	213	188	170	152	116	62																			
21	Detroit, Mich. (Woodward Ave.)	618	492	430	299	412	361	244	261	191	164	150	126	108	91	54																				
22	Toledo, Ohio (river mouth)	611	485	423	292	405	354	237	254	185	157	144	119	96	72																					
23	Lorain, Ohio	554	428	366	235	348	297	180	197	124	95	80	53	28																						
24	Cleveland, Ohio (main entrance)	534	408	346	215	328	277	160	176	102	73	59	33																							
25	Fairport, Ohio	504	378	316	185	298	247	130	146	73	44	30																								
26	Ashtabula, Ohio	478	352	290	159	272	221	104	119	45	15																									
27	Conneaut, Ohio	466	340	278	147	260	209	92	107	33																										
28	Erie, Pa.	439	313	251	120	233	182	65	78																											
29	Buffalo, N.Y. (north entrance)	396	270	208	77	190	139	22																												
30	Port Colborne, Canada	374	248	186	55	168	117																													
31	Rochester, N.Y.	275	149	89	95	59																														
32	Oswego, N.Y.	234	108	55	145																															
33	Toronto, Canada	349	223	161																																
34	Kingston, Canada	180	63																																	
35	Ogdensburg, N.Y.	126																																		
36	Montreal, Canada (c)	0																																		

(a) From abreast east end of U.S. center pier.
(b) From foot of Grand River Ave.
(c) From intersection Seaway-Ship Channel, Montreal Harbour.

EXPLANATION

Distances in these tables are expressed to the nearest even statute mile; fractions of 1/2 mile or more being taken as a full mile and those under the half dropped. The results are, therefore, at times inconsistent by 1 mile in their comparative differences. Thus, measured distances to two given points may differ uniformly by 0.8 mile; if the respective distances to the two points from a certain port measure 116.0 and 115.2, they appear in the table as 116 and 115, a difference of 1 mile; whereas from the next port listed, the distance to the same two points may measure 105.4 and 104.6, and both will appear in the table as 105.

Measurements are by the shortest marked or safe direct courses, starting (unless otherwise noted) from the main entrance between pierheads of breakwaters or piers, or from the principal landings of open roadsteads. Where landings are appreciably remote from protected entrances, the appropriate further distances, if desired, may be ascertained from the harbor descriptions or from charts.

Points in this table are arranged in the order of their location on the several lakes in the following sequence: Lake Ontario, Lake Erie, Lake Huron, Lake Michigan, and Lake Superior.

The distance between any two points appears in the line extending horizontally from the point first in order in the list and in the column headed by the other point.

Table 34--DISTANCES BETWEEN POINTS ON LAKE ONTARIO AND ST. LAWRENCE RIVER (statute miles)

Other tables to which initial points Nos. 1-3 are common:
35 - Lake Erie, St. Clair, Detroit, and Niagara Rivers.
36 - Lake Huron and St. Marys River.
37 - Lake Michigan.
38 - Lake Superior.

		36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3
		Quebec	St. Lambert Lock	Cote Ste. Catherine Lock	Beauharnois Lock	Colquhoun Island	Snell Lock	Eisenhower Lock	Iroquois Lock	Ogdensburg	Brockville	Alexandria Bay	Thousand Island Park	Clayton	Gananoque	Kingston	Picton	Deseronto	Belleville	Trenton	Cobourg	Port Hope	Toronto	Hamilton	Port Weller	Lewiston	Niagara-on-the-Lake	Olcott	Rochester	Sodus Bay	Little Sodus Bay	Oswego	Sackette Harbor	Cape Vincent	Port Colborne
1	OLD MACKINAC POINT (35, 36, 37, 38)[a]	1084	922	914	892	848	841	837	812	799	787	766	760	755	758	739	726	713	697	688	653	640	608	610	580	596	592	608	670	698	712	721	745	740	553
2	PORT HURON (35, 36, 38)[b]	837	675	667	645	601	594	590	565	552	540	519	513	508	511	492	479	466	450	441	408	401	361	363	333	351	345	361	423	451	465	474	498	493	306
3	PORT COLBORNE (35, 38)	531	369	361	339	295	288	284	259	246	234	213	207	202	205	186	173	160	144	135	100	95	55	57	27	45	39	55	117	145	139	168	192	187	
4	Cape Vincent, N. Y.	344	183	175	153	109	102	98	73	60	48	27	20	16	19	24	45	51	67	78	101	106	160	186	160	160	154	134	89	69	59	40	26		
5	Sackette Harbor, N. Y.	370	209	201	179	135	128	124	99	86	74	53	46	42	45	36	56	61	78	88	106	112	165	191	165	164	158	138	88	64	52	41			
6	Oswego, N. Y.	391	232	224	202	158	151	147	122	108	97	76	69	65	68	55	66	71	88	82	91	98	145	166	141	139	133	115	59	29	15				
7	Little Sodus Bay, N. Y.	401	241	233	211	167	160	156	131	118	106	85	78	74	77	64	73	78	88	70	85	90	136	157	131	130	124	104	48	18					
8	Sodus Bay, N. Y.	411	251	243	221	177	170	166	141	128	116	95	88	84	87	72	80	86	83	74	77	81	124	145	118	118	112	92	35						
9	Rochester, N. Y. (Charlotte)	432	271	263	241	197	190	186	161	149	136	115	108	104	107	90	98	89	73	64	57	60	98	117	89	89	83	63							
10	Olcott, N. Y.	470	316	306	286	242	235	231	206	193	181	160	153	149	152	134	121	109	92	83	51	47	38	55	28	26	22								
11	Niagara-on-the Lake, Canada	500	336	328	306	262	255	251	226	213	201	180	173	169	172	154	141	128	111	102	66	63	30	39	11	6									
12	Lewiston, N. Y.	508	342	334	312	268	261	257	232	219	207	186	179	175	178	160	147	134	117	108	72	69	36	45	17										
13	Port Weller, N. Y.	504	342	334	312	268	261	257	232	219	207	186	179	175	178	159	146	133	117	107	72	66	28	30											
14	Hamilton, Canada	530	367	359	337	293	286	282	257	244	232	211	205	200	204	185	160	156	140	131	94	88	*30												
15	Toronto, Canada (west entrance)	506	342	334	312	268	261	257	232	219	207	186	180	175	179	160	142	129	112	103	65	60													
16	Port Hope, Canada	449	289	281	259	215	208	204	179	166	154	132	126	121	125	106	85	72	56	47	7														
17	Coburg, Canada	444	283	275	253	209	202	198	173	160	148	127	120	116	120	101	79	67	50	41															
18	Trenton, Canada	417	255	247	225	181	174	170	145	132	120	101	94	90	89	71	40	28	11																
19	Belleville, Canada	406	244	236	214	170	163	159	134	121	109	90	84	80	78	60	29	17																	
20	Deseronto, Canada	390	228	220	198	154	147	143	118	105	93	74	68	63	62	44	13																		
21	Picton, Canada	383	222	214	192	148	141	137	112	99	87	68	62	57	56	37																			
22	Kingston, Canada	346	185	177	155	111	104	100	75	62	50	32	25	21	19																				
23	Gananoque, Canada	327	167	159	137	93	86	82	57	44	32	18	11	10																					
24	Clayton, N. Y.	327	167	159	137	93	86	82	57	44	32	11	4																						
25	Thousand Island Park, N. Y.	326	164	156	134	90	83	79	54	41	29	8																							
26	Alexandria Bay, N. Y.	317	156	148	127	83	76	72	46	33	22																								
27	Brockville, Canada	295	135	127	105	61	54	50	25	12																									
28	Ogdensburg, N. Y.	283	123	115	93	49	42	38	13																										
29	Iroquois Lock, Canada	270	110	102	80	36	29	25																											
30	Eisenhower Lock, N. Y.	245	85	77	55	11	4																												
31	Snell Lock, N. Y.	241	81	73	51	7																													
32	Colquhoun Island, Canada	233	74	66	44																														
33	Beauharnois Lock, Canada	190	30	22																															
34	Cote Ste. Catherine Lock, Canada	169	8																																
35	St. Lambert Lock, Canada	160																																	
36	Quebec, Canada	0																																	

(a) From sailing course point north of Old Mackinac Point.

(b) From foot of Grand River Ave.
To Toronto west entrance.

EXPLANATION

Explanation generally applicable to all tables is published in Table 33.

Points in this table are arranged in geographical sequence proceeding westward along the south shore and returning eastward along the north shore of the lake and down St. Lawrence River.

For determining distances to points located in other lakes, distances from all places listed in this table are given to the initial points Nos. 1 to 3, which also appear in the other tables respectively indicated by numeral designation. The through distance from a given point in this table to a given point in any other table is the sum of the respective distances to each given point from the initial point which is common to the two tables. Thus, Port Colborne being the common point for determining distances from Lake Ontario and St. Lawrence River points to points in Lake Superior (Table 38), a through distance would be derived as follows:

Port Colborne to Colquhoun Island	295
Port Colborne to Thunder Bay (Ft. William)	847
Colquhoun Island to Thunder Bay (Ft. William)	1,142

Table 35--DISTANCES BETWEEN POINTS ON LAKE ERIE AND ST. CLAIR, DETROIT, AND NIAGARA RIVERS (statute miles)

Other tables to which initial points Nos. 1-3 are common:
34 - Lake Ontario and St. Lawrence River.
36 - Lake Huron and St. Marys River.
37 - Lake Michigan.
38 - Lake Superior.

		37 Kingsville	36 Rondeau	35 Port Stanley	34 Port Burwell	33 Port Dover	32 Port Maitland	31 Niagara Falls	30 Tonawanda	29 Buffalo	28 Dunkirk	27 Erie	26 Conneaut	25 Ashtabula	24 Fairport	23 Cleveland	22 Lorain	21 Vermilion	20 Huron	19 Sandusky	18 Put-in-Bay	17 Port Clinton	16 Toledo	15 Monroe	14 Detroit River Light	13 Amherstburg	12 Trenton	11 Wyandotte	10 Detroit	9 Chatham	8 Mt. Clemens	7 St. Clair Flats	6 Algonac	5 Marine City	4 St. Clair	3 Port Huron	2 Port Colborne
1	OLD MACKINAC POINT (34, 36, 37, 38)[(a)]	358	414	459	475	527	538	568	580	569	539	500	473	460	435	417	399	391	387	380	363	369	363	348	334	326	324	320	309	322	296	286	274	266	259	247	553
2	PORT COLBORNE (34, 38)	201	146	109	89	52	18	41	33	22	35	65	92	104	130	160	180	190	198	204	204	213	237	227	219	227	239	234	244	292	278	267	281	287	294	306	
3	PORT HURON (34, 36, 38)(b)	111	167	212	228	280	291	341	333	322	292	253	226	213	188	170	152	144	140	133	116	122	116	101	87	79	77	73	62	75	49	39	27	19	12		
4	St. Clair, Mich.	99	155	200	216	268	279	330	322	311	281	241	214	201	176	158	141	133	129	122	105	111	105	89	75	67	65	61	50	63	37	27	15	7			
5	Marine City, Mich.	92	148	193	209	261	272	322	314	303	273	234	207	194	169	151	133	125	121	114	97	103	97	82	68	60	58	54	43	56	30	20	7				
6	Algonac, Mich.	86	143	188	203	255	267	317	309	298	268	228	201	188	163	145	128	120	116	109	92	98	92	76	62	55	53	48	37	49	22	14					
7	St. Clair Flats, Mich., Canada[(c)]	72	129	174	189	241	253	303	295	284	254	215	187	174	149	131	114	106	102	95	78	84	78	62	48	41	39	34	23	35	15						
8	Mt. Clemens, Mich.	83	140	185	200	252	264	314	306	295	265	226	199	185	161	142	125	117	113	106	89	95	89	73	59	53	50	45	35	49							
9	Chatham, Canada	97	154	199	214	265	278	328	320	309	279	239	212	198	174	156	139	130	127	120	102	108	102	87	73	66	63	59	48								
10	Detroit, Mich. (Woodward Ave.)	49	106	151	166	217	230	280	272	261	231	191	164	150	128	108	91	82	79	72	54	60	54	39	25	18	15	11									
11	Wyandotte, Mich.	39	96	141	156	208	220	270	262	251	221	182	154	141	116	98	81	73	69	62	45	51	45	29	15	8	5										
12	Trenton, Mich.	34	91	136	151	203	215	265	257	246	216	177	149	136	111	93	76	68	64	57	40	46	40	24	10	13											
13	Amherstburg, Canada	31	88	133	148	200	212	262	254	243	213	173	146	133	108	90	73	64	61	54	36	42	36	21	7												
14	Detroit River Light, Mich.	24	81	126	141	193	205	255	247	236	206	166	130	126	101	83	66	58	54	47	30	36	30	14													
15	Monroe, Mich. (piers)	33	89	134	149	200	213	263	255	244	214	174	147	133	109	89	68	60	54	48	30	35	21														
16	Toledo, Ohio (river mouth)	45	98	143	159	210	223	272	265	254	224	185	157	144	119	96	72	65	59	52	38	40															
17	Port Clinton, Ohio	37	75	120	136	187	199	249	241	230	200	160	131	118	92	67	43	36	29	22	12																
18	Put-in-Bay, Ohio	27	66	111	127	177	190	240	232	221	190	150	122	109	83	61	38	32	27	21																	
19	Sandusky, Ohio (wharves)	41	69	114	130	178	190	239	232	221	189	149	120	107	79	55	39	21	14																		
20	Huron, Ohio	47	68	111	124	172	184	233	226	215	183	142	113	99	72	47	20	11																			
21	Vermilion, Ohio	46	62	104	117	163	175	225	217	206	174	133	104	90	63	37	11																				
22	Lorain, Ohio	48	57	97	109	154	166	215	208	197	164	124	95	80	53	28																					
23	Cleveland, Ohio (main entrance)	65	53	85	93	134	146	194	187	176	143	102	73	59	33																						
24	Fairport, Ohio	83	48	62	66	104	116	165	157	146	114	73	44	30																							
25	Ashtabula, Ohio	108	63	56	47	79	90	138	130	119	86	45	15																								
26	Conneaut, Ohio	122	74	59	48	68	80	126	118	107	74	33																									
27	Erie, Pa.	149	98	70	53	47	54	98	89	78	45																										
28	Dunkirk, N.Y.	188	134	98	78	50	28	55	48	37																											
29	Buffalo, N.Y.	218	163	126	106	72	38	21	13																												
30	Tonawanda, N.Y.	230	174	137	117	83	40	8																													
31	Niagara Falls, N.Y.	237	182	145	125	90	57																														
32	Port Maitland, Canada	187	132	95	75	37																															
33	Port Dover, Canada	175	120	83	62																																
34	Port Burwell, Canada	123	65	23																																	
35	Port Stanley, Canada	108	49																																		
36	Rondeau, Canada	63																																			
37	Kingsville, Canada	0																																			

(a) From sailing course point north of Old Mackinac Point.
(b) From foot of Grand River Ave.
(c) From south end of canal dike.

EXPLANATION

Explanation generally applicable to all tables is published in Table 33.

Points in this table are arranged in geographical sequence proceeding southward in St. Clair River and Lake and Detroit River, eastward along the south shore of Lake Erie to Niagara River, and returning westward along the north lake shore.

For determining distances to points located in other lakes, distances from all places listed in this table are given to the initial points Nos. 1 to 3, which also appear in the other tables respectively indicated by numeral designation. The through distance from a given point in this table to a given point in any other table is the sum of the respective distances to each given point from the initial point which is common to the two tables. Thus, Old Mackinac Point being the common point for determining distances from Lake Erie to points in Lake Michigan (Table 37), a through distance would be derived as follows:

Old Mackinac Point to Tonawanda	580
Old Mackinac Point to Sheboygan	212
Tonawanda to Sheboygan	792

Table 36--DISTANCES BETWEEN POINTS ON LAKE HURON AND ST. MARYS RIVER (statute miles)

Other tables to which initial points Nos. 1-3 are common:
34 - Lake Ontario and St. Lawrence River.
35 - Lake Erie, St. Clair, Detroit, and Niagara Rivers.
37 - Lake Michigan.
38 - Lake Superior.

		38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
		Thessalon	Algoma Mills	Gore Bay	Little Current	Killarney	French River	Key Harbor	Byng Inlet	Parry Sound	Depot Harbor	Victoria Harbor	Midland	Penetanguishene	Collingwood	Meaford	Owen Sound	Wiarton	Southampton	Kincardine	Goderich	Port Sanilac	Harbor Beach	Saginaw	Bay City	East Tawas	Au Sable	Alpena	Rockport	Stoneport	Rogers City	Cheboygan	Mackinac Island	St. Ignace	Port Dolomite	De Tour	Sault Ste. Marie	Old Mackinac Point
1	PORT HURON (34, 35, 38)(a)	*230	+238	+250	225	213	224	232	225	247	243	267	266	265	258	241	236	228	131	94	65	33	63	175	162	119	117	157	166	182	194	233	243	247	239	224	269	247
2	OLD MACKINAC POINT (34, 35, 37, 38)(b)	69	*101	*116	*143	*167	*186	*205	*211	235	231	256	255	254	247	230	227	217	189	192	211	215	186	223	210	163	142	115	83	78	54	18	7	6	37	45	90	
3	SAULT STE. MARIE (38)(c)	&48	&88	&106	&131	&155	&184	&193	&201	&242	+238	268	267	266	259	243	230	229	207	213	234	238	208	246	232	185	165	137	107	96	84	84	84	90	88	45		
4	DeTour, Mich.	%24	%58	%76	%101	%125	%154	%163	%171	201	198	224	222	221	214	197	194	185	162	168	189	193	164	201	187	140	120	92	61	51	40	39	39	44	33			
5	Port Dolomite, Mich.	+92	+90	+108	+135	189	197	199	188	218	215	243	241	238	233	220	219	207	176	183	203	218	190	219	206	163	143	113	76	70	47	31	26	28				
6	St. Ignace, Mich.	%68	*100	*115	*142	*166	*195	*204	*209	234	231	256	254	252	246	229	227	217	191	194	214	216	187	224	210	163	143	115	83	82	55	20	6					
7	Mackinac Island, Mich.	%63	*95	*110	*137	*161	*190	*199	*204	229	226	251	249	248	241	224	221	212	186	189	209	212	184	220	207	159	140	111	79	77	50	17						
8	Cheboygan, Mich.	%63	*92	*106	*133	*157	*188	*195	*197	221	217	242	241	240	233	218	213	204	175	178	198	202	173	210	196	149	129	101	69	66	40							
9	Rogers City, Mich.	*63	+74	+87	+114	+138	157	163	154	187	183	206	206	206	199	182	177	169	139	142	161	163	134	171	157	110	90	61	31	27								
10	Stoneport, Mich.	+75	+73	+92	+118	137	145	147	147	166	163	190	189	186	181	164	163	151	115	120	146	158	130	154	141	97	76	48	9									
11	Rockport, Mich.	+79	+79	+92	+119	123	136	143	143	166	162	187	186	185	178	161	158	148	112	113	132	134	106	142	120	82	62	31										
12	Alpena, Mich.	+107	+107	+120	+143	131	145	151	152	174	171	195	193	192	185	168	165	156	109	107	124	125	97	129	116	69	49											
13	Au Sable, Mich.	+135	+135	+148	158	146	160	163	166	183	180	204	202	201	189	177	174	165	98	85	93	86	58	83	69	21												
14	East Tawas, Mich.	+155	+155	+168	175	163	176	180	182	199	196	220	218	217	210	194	190	181	110	94	95	88	60	68	54													
15	Bay City, Mich.	+202	+202	+215	222	210	223	228	229	245	243	267	265	264	257	240	237	228	153	136	137	130	102	13														
16	Saginaw, Mich.	+216	+216	+228	235	223	237	242	242	258	356	280	278	278	271	254	250	241	167	149	151	144	115															
17	Harbor Beach, Mich.	+178	+178	+191	171	159	171	176	178	194	190	214	213	212	205	188	185	175	79	56	47	32																
18	Port Sanilac, Mich.	+207	+207	+219	197	185	196	201	201	219	215	239	238	237	230	213	210	200	97	70	47																	
19	Goderich, Canada	+198	+198	204	169	159	172	172	174	192	189	213	211	210	207	187	183	174	64	36																		
20	Kincardine, Canada	+173	+174	174	141	128	142	149	144	162	158	182	181	180	176	156	153	144	30																			
21	Southampton, Canada	+166	+166	155	122	110	123	130	125	143	140	163	162	161	157	137	134	125																				
22	Wiarton, Canada (d)	+188	158	142	110	94	88	79	81	74	71	76	74	73	53	36	29																					
23	Owen Sound, Canada (d)	+197	167	152	119	103	97	97	89	79	75	71	70	69	46	29																						
24	Meaford, Canada (d)	+200	169	153	121	105	96	96	86	71	68	55	53	52	24																							
25	Collingwood, Canada (d)	+217	186	171	138	120	108	107	97	80	76	57	55	54																								
26	Penetanguishene, Canada (d)	+224	187	172	139	120	106	104	94	72	69	12	10																									
27	Midland, Canada (d)	+225	188	173	140	121	107	105	95	73	70	7																										
28	Port McNicoll, Canada (d)	+227	190	174	142	122	108	106	97	75	71																											
29	Depot Harbor, Canada (d)	193	155	140	107	87	73	71	62	6																												
30	Parry Sound, Canada (d)	197	159	143	111	91	77	75	65																													
31	Byng Inlet, Canada (d)	155	118	102	70	50	31	27																														
32	Key Harbor, Canada (d)	148	110	94	62	42	22																															
33	French River, Canada (d)	139	101	86	53	33																																
34	Killarney, Canada (d)	110	72	56	24																																	
35	Little Current, Canada	86	48	33																																		
36	Gore Bay, Canada	61	27																																			
37	Algoma Mills, Canada	43																																				
38	Thessalon, Canada	0																																				

(a) From foot of Grand River Ave.
(b) From sailing course point north of Old Mackinac Point.
(c) From abreast east end of U.S. center pier, and (except those marked &) via Middle Neebish and Detour; distances downbound through West Neebish are 1 mile less.
(d) Distances to Georgian Bay ports (except those marked *, +, &, %) are via the bay entrance from Lake Huron and St. Marys River points and via Little Current from North Channel points.

* Via False Detour and North Channels.
+ Via Mississagi Strait and North Channel.
& Via Lake Nicolet, St. Joseph, and North Channels.
% Via Potagannissing Bay and North Channel.

EXPLANATION

Explanation generally applicable to all tables is published in Table 33.

Points in this table are arranged in geographical sequence proceeding from St. Marys River southward along the west shore, and returning northward up the east shore, around Georgian Bay, and westward through North Channel.

For determining distances to points located in other lakes, distances from all places listed in this table are given to the initial points Nos. 1 to 3, which also appear in the other tables respectively indicated by numeral designation. The through distance from a given point in this table to a given point in any other table is the sum of the respective distances to each given point from the initial point which is common to the two tables.

Table 37--DISTANCES BETWEEN POINTS ON LAKE MICHIGAN (statute miles)

Other tables to which initial point No. 1 is common:
- 34 - Lake Ontario and St. Lawrence River.
- 35 - Lake Erie, St. Clair, Detroit, and Niagara Rivers.
- 36 - Lake Huron and St. Marys River.
- 38 - Lake Superior.

		38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
		Beaver Island Harbor	Petoskey	Charlevoix	Traverse City	Frankfort	Portage Lake	Manistee	Ludington	Pentwater	White Lake	Muskegon	Grand Haven	Holland	Saugatuck	South Haven	St. Joseph	Michigan City	Gary	Indiana Harbor	South Chicago	Chicago	Waukegan	Kenosha	Racine	Milwaukee	Port Washington	° Sheboygan	Manitowoc	Two Rivers	Kewaunee	Algoma	Sturgeon Bay	Green Bay	Menominee	Escanaba	Manistique	Port Inland
1	OLD MACKINAC POINT (34, 35, 36, 38)(a)	41	55	56	67	122	142	150	173	164	213	224	236	257	263	281	300	325	336	334	333	324	296	283	272	250	237	212	191	187	170	161	155	198	155	129	75	50
2	Port Inland, Mich.	31	68	55	88	96	116	123	146	157	186	197	211	229	235	253	271	298	314	308	304	299	270	254	245	226	204	179	161	152	131	124	110	140	104	78	23	
3	Manistique, Mich.	43	76	64	94	91	110	118	141	152	182	193	207	225	232	250	268	294	303	301	298	290	260	244	235	220	195	168	146	142	120	111	103	135	92	66		
4	Escanaba, Mich.	90	113	90	120	91	106	112	130	141	170	181	195	213	220	238	255	280	288	286	283	274	242	226	217	201	176	149	127	122	109	90	69	101	55			
5	Menominee, Mich. & Wis.(b)	*122	*134	*119	*138	80	86	87	98	108	135	146	159	177	183	200	216	239	246	243	240	230	198	184	172	155	130	103	81	75	52	43	22	49				
6	Green Bay, Wis. (city)(b)	*165	176	160	178	105	111	112	123	134	159	171	184	202	209	225	242	264	272	268	265	255	223	209	197	180	155	128	106	101	78	68	47					
7	Sturgeon Bay, Wis. (town)	123	129	113	131	58	64	65	76	87	113	124	137	155	162	178	195	217	225	232	218	208	176	162	150	133	108	81	58	54	30	21						
8	Algoma, Wis.	131	135	119	136	59	60	59	66	75	100	111	123	142	148	163	179	200	206	203	200	190	159	142	132	115	80	62	40	36	13							
9	Kewaunee, Wis.	138	143	126	143	62	60	58	61	70	93	104	116	135	141	156	171	192	197	194	191	181	149	133	123	105	70	53	31	26								
10	Two Rivers, Wis.	156	159	142	160	75	67	62	57	61	78	89	101	118	123	137	151	170	174	171	168	158	125	109	100	82	55	29	6									
11	Manitowoc, Wis.	161	163	147	164	79	71	66	60	64	79	90	102	118	123	137	150	169	173	169	166	156	123	107	97	79	53	26										
12	Sheboygan, Wis.	180	181	165	182	95	83	76	80	63	68	78	87	102	106	118	130	146	149	146	143	132	99	83	74	55	29											
13	Port Washington, Wis.	206	205	189	206	119	104	98	80	78	72	77	84	94	97	105	112	124	125	121	118	107	74	58	48	29												
14	Milwaukee, Wis.	228	227	211	228	140	125	117	97	91	78	80	83	88	89	93	96	104	103	99	96	85	51	35	26													
15	Racine, Wis.	242	241	225	242	153	137	129	108	100	81	80	80	79	80	80	78	84	83	78	75	64	30	14														
16	Kenosha, Wis.	252	251	234	252	163	147	138	117	108	86	87	86	82	82	79	75	76	73	67	64	54	18															
17	Waukegan, Ill.	266	265	249	266	177	160	152	130	122	100	96	93	86	84	78	70	64	58	52	49	38																
18	Chicago, Ill.	294	293	276	293	204	186	179	156	148	120	114	108	95	90	77	68	38	25	19	15																	
19	South Chicago, Ill.	302	301	285	302	213	196	188	165	154	127	120	114	100	98	79	60	33	14	7																		
20	Indiana Harbor, Ind.	304	303	287	304	215	198	189	167	156	129	122	115	99	98	79	59	31	13																			
21	Gary, Ind.	309	308	292	300	216	199	191	167	157	129	121	114	99	93	77	55	22																				
22	Michigan City, Ind.	295	294	278	295	206	189	181	157	146	117	108	99	82	75	57	36																					
23	St. Joseph, Mich.	269	268	251	268	179	162	154	130	119	88	78	69	50	44	24																						
24	South Haven, Mich.	251	250	233	250	161	144	136	111	101	39	56	49	29	22																							
25	Saugatuck, Mich.	232	231	215	232	143	126	118	93	83	51	40	29	8																								
26	Holland, Mich.	227	226	210	227	137	120	112	88	77	45	34	23																									
27	Grand Haven, Mich.	206	205	189	206	117	100	92	67	57	25	13																										
28	Muskegon, Mich.	195	194	178	195	106	89	80	56	46	13																											
29	White Lake, Mich.	184	183	167	184	95	78	69	45	35																												
30	Pentwater, Mich.	154	153	137	154	65	48	39	14																													
31	Ludington, Mich.	143	142	126	143	54	37	26																														
32	Manistee, Mich.	118	117	100	118	28	10																															
33	Portage Lake, Mich.	110	109	93	110	20																																
34	Frankfort, Mich.	93	92	75	92																																	
35	Traverse City, Mich.	60	58	45																																		
36	Charlevoix, Mich.	33	18																																			
37	Petoskey, Mich.	37																																				
38	Beaver Island Harbor, Mich.	0																																				

(a) From sailing course point north of Old Mackinac Point.

(b) Distances from Menominee and Green Bay to Lake Michigan points except those marked (*) are via Sturgeon Bay Canal.

° Via Rock Island Passage.

EXPLANATION

Explanation generally applicable to all tables is published in Table 33.

Points in this table are arranged in geographical sequence proceeding southward along the west shore and returning northward along the east shore.

For determining distances to points in other lakes, distances from all places listed in this table are given to Old Mackinac Point, and this initial point also appears in each of the other tables respectively indicated by numeral designation. The through distance from a given point in this table to a given point in any other table is the sum of the respective distances to each given point from Old Mackinac Point, common to the two tables. Thus, a through distance from a Lake Michigan point to a point in Lake Superior (Table 38) would be derived as follows:

Old Mackinac Point to Racine ---------------- 272
Old Mackinac Point to Ashland ---------------- 439

Racine to Ashland-------------------------- 711

Table 38--DISTANCES BETWEEN POINTS ON LAKE SUPERIOR (statute miles)

Other tables to which initial points Nos. 1-4 are common:
34 - Lake Ontario and St. Lawrence River.
35 - Lake Erie, St. Clair, Detroit, and Niagara Rivers.
36 - Lake Huron and St. Marys River.
37 - Lake Michigan.

No.	Point	39 Gargantua Harbor	38 Michipicoten Harbor	37 Quebec Harbor	36 Peninsula Harbor	35 Rossport	34 Thunder Bay (Pt. Arthur)	33 Thunder Bay (Ft. William)	32 Passage Island	31 Rock of Ages	30 Grand Marais, Minn.	29 Taconite	28 Silver Bay	27 Two Harbors	26 Duluth	25 Superior	24 Port Wing	23 Bayfield	22 Washburn
1	PORT COLBORNE (34, 35)	666	697	691	771	809	848	847	804	838	880	909	927	946	970	968	939	912	920
2	PORT HURON (34, 35, 36)(a)	360	391	385	465	503	542	541	498	532	574	603	621	640	664	662	633	606	614
3	OLD MACKINAC POINT (34, 35, 36, 37, 38)(b)	181	212	206	285	324	363	362	319	353	395	426	444	461	485	483	454	426	435
4	SAULT STE. MARIE (37)(c)	91	121	116	195	234	273	272	229	263	305	334	352	371	394	393	364	336	345
5	Whitefish Point, Mich.	54	83	74	153	192	231	230	187	221	263	292	310	329	352	351	322	294	303
6	Grand Marais, Mich.	78	102	70	144	171	198	197	154	182	224	255	270	*289	*312	*310	*282	*252	*260
7	Munising, Mich.	112	136	97	162	179	193	192	150	174	*212	245	260	*271	*293	*291	*263	*233	*240
8	Marquette, Mich. (docks)	135	154	112	160	164	171	170	128	*149	*181	228	239	*239	*261	*260	*231	*201	*209
9	Huron Bay, Mich. (village)	165	179	132	159	152	157	156	113	*110	*142	*156	*181	*201	*223	*222	*193	*163	*171
10	L'Anse, Mich.	179	192	146	169	162	*145	*144	108	*95	*127	*151	*168	*186	*208	*206	*178	*148	*156
11	Mendota Canal, Mich.	138	152	105	125	117	122	121	78	103	145	172	190	212	234	232	204	*174	*182
12	Copper Harbor, Mich.	137	145	100	112	99	100	99	56	77	119	142	161	185	208	206	178	150	159
13	Eagle Harbor, Mich.	151	159	114	122	102	96	95	53	65	105	129	146	170	194	192	163	135	143
14	Portage Entry, Mich.	168	181	135	157	149	*130	*129	94	*81	*113	136	153	*171	*193	*192	*163	*133	*141
15	Chassell, Mich.	177	190	143	166	145	125	124	89	76	108	128	146	166	188	187	158	128	136
16	Lake Linden, Mich.	185	198	151	174	151	131	130	95	82	113	136	153	172	194	193	163	134	142
17	Dollar Bay, Mich.	180	192	146	163	139	119	118	83	70	102	122	140	160	182	181	152	122	130
18	Houghton, Mich.	182	195	149	160	136	116	115	80	67	99	118	135	157	179	178	149	119	127
19	Keweenaw Waterway, Upper Entry, Mich.	188	187	142	149	126	106	105	69	36	88	108	125	147	169	167	139	109	116
20	Ontonagon, Mich.	221	228	183	189	165	117	116	103	68	76	86	95	114	136	135	106	74	78
21	Ashland, Wis.	295	304	258	261	237	164	163	165	115	85	77	62	71	93	92	63	16	5
22	Washburn, Wis.	291	300	254	256	222	160	159	161	111	81	72	57	67	89	88	59	12	
23	Bayfield, Wis.	282	291	246	254	221	149	148	152	99	70	60	45	57	78	77	49		
24	Port Wing, Wis.	312	319	275	272	233	169	168	175	121	83	56	35	22	34	32			
25	Superior, Wis.	340	347	303	300	259	195	195	199	147	107	78	54	28	7				
26	Duluth, Minn.	342	349	305	300	259	195	194	200	147	105	77	53	26					
27	Two Harbors, Minn.	319	327	281	277	236	172	171	177	124	82	55	27						
28	Silver Bay, Minn.	300	302	260	250	210	145	142	156	100	55	25							
29	Taconite, Minn.	280	283	240	227	190	130	127	136	78	31								
30	Grand Marais, Minn.	252	256	214	199	157	92	91	99	47									
31	Rock of Ages, Mich.	209	213	171	155	112	49	48	53										
32	Passage Island, Mich.	164	166	127	102	63	44	43											
33	Thunder Bay (Ft. William), Canada	207	209	170	141	101	3												
34	Thunder Bay (Pt. Arthur), Canada	208	209	171	142	102													
35	Rossport, Canada	157	155	125	71														
36	Peninsula Harbor, Canada	114	112	86															
37	Quebec Harbor, Canada	41	40																
38	Michipicoten Harbor, Canada	32																	
39	Gargantua Harbor, Canada	0																	

No.	Point	21 Ashland	20 Ontonagon	19 Keweenaw W. Upper Ent.	18 Houghton	17 Dollar Bay	16 Lake Linden	15 Chassell	14 Portage Entry	13 Eagle Harbor	12 Copper Harbor	11 Mendota Canal	10 L'Anse	9 Huron Bay	8 Marquette	7 Munising	6 Grand Marais, Mich.	5 Whitefish Point	4 Sault Ste. Marie
1	PORT COLBORNE (34, 35)	924	850	807	796	793	799	791	782	779	764	764	792	779	738	706	667	617	575
2	PORT HURON (34, 35, 36)(a)	618	544	501	490	487	493	485	476	473	458	458	486	473	420	400	361	311	269
3	OLD MACKINAC POINT (34, 35, 36, 37, 38)(b)	439	365	322	311	308	314	306	297	294	279	279	307	284	240	221	182	134	90
4	SAULT STE. MARIE (37)(c)	349	*274	*232	221	218	224	215	207	204	189	189	217	204	150	131	92	42	
5	Whitefish Point, Mich.	307	*232	*190	179	176	182	173	165	162	147	147	175	162	117	89	50		
6	Grand Marais, Mich.	*264	*187	*143	133	130	135	127	119	123	106	105	129	114	68	40			
7	Munising, Mich.	*245	*168	*124	114	111	116	108	99	113	100	93	110	93	42				
8	Marquette, Mich. (docks)	*213	*136	*93	84	81	84	76	68	91	76	67	78	62					
9	Huron Bay, Mich. (village)	*175	*98	*54	44	41	46	38	30	74	60	44	39						
10	L'Anse, Mich.	*160	*83	*39	29	26	31	23	14	70	71	51							
11	Mendota Canal, Mich.	*186	*110	*69	55	52	58	50	41	42	27								
12	Copper Harbor, Mich.	163	88	45	56	59	71	65	60	16									
13	Eagle Harbor, Mich.	147	72	31	41	45	57	50	56										
14	Portage Entry, Mich.	*14[illegible]	*68	*25	14	11	17	9											
15	Chassell, Mich.	140	63	20	9	6	12												
16	Lake Linden, Mich.	146	69	26	15	11													
17	Dollar Bay, Mich.	134	57	14	3														
18	Houghton, Mich.	131	54	11															
19	Keweenaw Waterway, Upper Entry, Mich.	120	44																
20	Ontonagon, Mich.	82																	

(a) From foot of Grand River Ave.
(b) From sailing course point north of Old Mackinac Point.
(c) From abreast east end of United States center pier.
* Via Keweenaw Waterway.

EXPLANATION

Explanation generally applicable to all tables is published in Table 33.

Points in this table are arranged in geographical sequence proceeding westward along the south shore and returning eastward around the north shore.

For determining distances to points located in other lakes, distances from all places listed in this table are given to the initial points Nos. 1 to 4, which also appear in the other tables respectively indicated by numeral designation. The through distance from a given point in this table to a given point in any other table is the sum of the respective distances to each given point from the initial point which is common to the two tables. Thus, Port Huron being the common point for determining distances from Lake Superior points to points in Lake Erie (Table 35, a through distance would be derived as follows:

Port Huron to Ontonagon	544
Port Huron to Dunkirk	292
Ontonagon to Dunkirk	836

ILLINOIS WATERWAY CHANNELS AND DISTANCES TABLE

No.	Name of channel	Length of connecting channel	From lake shore, Wilmette Harbor*	From east end of north pier, Chicago Harbor	From east end of north pier, Calumet Harbor
		Miles	Miles	Miles	Miles
1	North Shore Channel-From Wilmette Harbor	8.1			
	To connection with North Branch of Chicago River		8.1	9	59.3
2	Chicago River, North Branch-From North Shore Channel	7.3			
	To junction of branches and main channel		15.5	1.6	52
3	Chicago River, Main Channel-From junction of branches	1.6			
	To east end of north pier, Chicago Harbor		17		53.6
4	Chicago River, South Branch-From junction of branches	3.9			
	West Fork of South Branch	0.6			
	To connection with Sanitary and Ship Canal (No. 8-a)		20	6.1	47.5
5	Calumet River-From east end of north pier, Calumet Harbor	7.7	67.5	53.6	
6	Little Calumet River-West from Calumet River cutoff channel	6	59.8	45.9	7.7
7	Calumet-Sag Channel-From Little Calument River connection	16.2	53.8	39.9	13.7
	To connection with Sanitary and Ship Canal (No. 8-b)		37.6	23.7	29.9
8	Chicago Sanitary and Ship Canal:				
	(a) From West Fork of South Branch, Chicago River (No. 4)	30			
	(b) From Calumet-Sag Channel connection (No. 7)	12.4			
	To connection with Des Plaines River, Lockport Lock		50	36.1	42.3
9	Des Plaines River-From Lockport Lock	18.1			
	To head of Illinois River		68.1	54.3	60.5
10	Illinois River-From head of river	272.9			
	To mouth at Mississippi River		341.1	327.2	333.4
11	Illinois River-From head of river	62.7			
	To connection of Illinois and Mississippi Canal (No. 12)		130.9	117	123.2
12	Illinois and Mississippi Canal-From Illinois River**	75			
	To Mississippi River at mouth of Rock River		205.9	192	198.1

*The Metropolitan Sanitary District of Greater Chicago lock at Wilmette Harbor is not operated for navigation.

**As of July 1, 1951, operation of the lock on the Illinois and Mississippi (Hennepin) Canal and maintenance of the Canal was discontinued.

Distances on New York State Waterways (statute miles)

City and local point	From Buffalo, Erie Basin	From Oswego, Lake Terminal	From Troy Lock	From New York City, (Battery)
Erie Canal	**Miles**	**Miles**	**Miles**	**Miles**
Buffalo-Erie Basin	------------	214.2	353.3	505.2
Tonawanda-Terminal	12.9	201.3	340.3	492.3
Lockport-Lower Terminal	30.9	183.3	322.3	474.3
Rochester	93.9	126.9	265.9	417.9
Newark-Dock	124.3	89.9	228.9	380.8
Syracuse-Terminal	190.1	37.2	176.2	328.2
Rome-Terminal	235.9	69.1	117.3	269.3
Utica-Terminal	249.9	83.1	104.9	256.8
Little Falls-Terminal	270.8	104.0	82.5	234.4
Amsterdam-Terminal	313.3	146.5	40.0	191.9
Schenectady	330.1	163.3	23.8	175.8
Cohoes	351.6	184.8	1.7	153.6
Troy Lock	353.3	186.5	---------	151.9
Cayuga and Seneca Canals				
Watkins Glen	201.4	116.8	255.9	407.9
Ithaca	191.4	106.7	245.8	397.8
Oswego Canal				
Fulton-Dock wall	202.5	11.7	174.7	326.7
Oswego-Lake Terminal	214.2	------------	186.5	338.4
Champlain Canal and Lake				
Mechanicville-Terminal	360.1	193.3	11.4	163.3
Fort Edward-Terminal	388.7	222.0	40.1	192.0
Whitehall-Terminal	411.2	244.5	62.6	214.5
Burlington-Landing	481.8	315.1	133.1	285.1
Plattsburgh-Terminal	497.2	330.5	148.5	300.5
Rouses Point-Terminal	533.3	366.5	173.0	325.0
Hudson River				
Troy-Terminal	354.7	187.9	1.4	150.5
Albany	360.4	193.6	7.1	144.8
Hudson	388.8	222.0	36.9	116.4
Poughkeepsie	429.5	262.7	76.2	75.7
New York City (Battery)	505.2	338.4	151.9	---------

Conversion of Compass Points to Degrees

	Points	Angular measure				Points	Angular measure		
NORTH TO EAST		°	'	"	SOUTH TO WEST		°	'	"
North	0	0	00	00	South	16	180	00	00
N¼E	¼	2	48	45	S¼W	16¼	182	48	45
N½E	½	5	37	30	S½W	16½	185	37	30
N¾E	¾	8	26	15	S¾W	16¾	188	26	15
N by E	1	11	15	00	S by W	17	191	15	00
N by E¼E	1¼	14	03	45	S by W¼W	17¼	194	03	45
N by E½E	1½	16	52	30	S by W½W	17½	196	52	30
N by E¾E	1¾	19	41	15	S by W¾W	17¾	199	41	15
NNE	2	22	30	00	SSW	18	202	30	00
NNE¼E	2¼	25	18	45	SSW¼W	18¼	205	18	45
NNE½E	2½	28	07	30	SSW½W	18½	208	07	30
NNE¾E	2¾	30	56	15	SSW¾W	18¾	210	56	15
NE by N	3	33	45	00	SW by S	19	213	45	00
NE¾N	3¼	36	33	45	SW¾S	19¼	216	33	45
NE½N	3½	39	22	30	SW½S	19½	219	22	30
NE¼N	3¾	42	11	15	SW¼S	19¾	222	11	15
NE	4	45	00	00	SW	20	225	00	00
NE¼E	4¼	47	48	45	SW¼W	20¼	227	48	45
NE½E	4½	50	37	30	SW½W	20½	230	37	30
NE¾E	4¾	53	26	15	SW¾W	20¾	233	26	15
NE by E	5	56	15	00	SW by W	21	236	15	00
NE by E¼E	5¼	59	03	45	SW by W¼W	21¼	239	03	45
NE by E½E	5½	61	52	30	SW by W½W	21½	241	52	30
NE by E¾E	5¾	64	41	15	SW by W¾W	21¾	244	41	15
ENE	6	67	30	00	WSW	22	247	30	00
ENE¼E	6¼	70	18	45	WSW¼W	22¼	250	18	45
ENE½E	6½	73	07	30	WSW½W	22½	253	07	30
ENE¾E	6¾	75	56	15	WSW¾W	22¾	255	56	15
E by N	7	78	45	00	W by S	23	258	45	00
E¾N	7¼	81	33	45	W¾S	23¼	261	33	45
E½N	7½	84	22	30	W½S	23½	264	22	30
E¼N	7¾	87	11	15	W¼S	23¾	267	11	15
EAST TO SOUTH					WEST TO NORTH				
East	8	90	00	00	West	24	270	00	00
E¼S	8¼	92	48	45	W¼N	24¼	272	48	45
E½S	8½	95	37	30	W½N	24½	275	37	30
E¾S	8¾	98	26	15	W¾N	24¾	278	26	15
E by S	9	101	15	00	W by N	25	281	15	00
ESE¾E	9¼	104	03	45	WNW¾W	25¼	284	03	45
ESE½E	9½	106	52	30	WNW½W	25½	286	52	30
ESE¼E	9¾	109	41	15	WNW¼W	25¾	289	41	15
ESE	10	112	30	00	WNW	26	292	30	00
SE by E¾E	10¼	115	18	45	NW by W¾W	26¼	295	18	45
SE by E½E	10½	118	07	30	NW by W½W	26½	298	07	30
SE by E¼E	10¾	120	56	15	NW by W¼W	26¾	300	56	15
SE by E	11	123	45	00	NW by W	27	303	45	00
SE¾E	11¼	126	33	45	NW¾W	27¼	306	33	45
SE½E	11½	129	22	30	NW½W	27½	309	22	30
SE¼E	11¾	132	11	15	NW¼W	27¾	312	11	15
SE	12	135	00	00	NW	28	315	00	00
SE¼S	12¼	137	48	45	NW¼N	28¼	317	48	45
SE½S	12½	140	37	30	NW½N	28½	320	37	30
SE¾S	12¾	143	26	15	NW¾N	28¾	323	26	15
SE by S	13	146	15	00	NW by N	29	326	15	00
SSE¾E	13¼	149	03	45	NNW¾W	29¼	329	03	45
SSE½E	13½	151	52	30	NNW½W	29½	331	52	30
SSE¼E	13¾	154	41	15	NNW¼W	29¾	334	41	15
SSE	14	157	30	00	NNW	30	337	30	00
S by E¾E	14¼	160	18	45	N by W¾W	30¼	340	18	45
S by E½E	14½	163	07	30	N by W½W	30½	343	07	30
S by E¼E	14¾	165	56	15	N by W¼W	30¾	345	56	15
S by E	15	168	45	00	N by W	31	348	45	00
S¾E	15¼	171	33	45	N¾W	31¼	351	33	45
S½E	15½	174	22	30	N½W	31½	354	22	30
S¼E	15¾	177	11	15	N¼W	31¾	357	11	15
South	16	180	00	00	North	32	360	00	00

Conversion Tables

INTERNATIONAL NAUTICAL MILES TO STATUTE MILES

1 nautical mile 6,076.12 feet or 1,852 meters 1 statute mile = 5,280 feet or 1,609.35 meters

Nautical miles	0	1	2	3	4	5	6	7	8	9
0	0.000	1.151	2.302	3.452	4.603	5.754	6.905	8.055	9.206	10.357
10	11.508	12.659	13.809	14.960	16.111	17.262	18.412	19.563	20.714	21.865
20	23.016	24.166	25.317	26.468	27.619	28.769	29.920	31.071	32.222	33.373
30	34.523	35.674	36.825	37.976	39.126	40.277	41.428	42.579	43.730	44.880
40	46.031	47.182	48.333	49.483	50.634	51.785	52.936	54.087	55.237	56.388
50	57.539	58.690	59.840	60.991	62.142	63.293	64.444	65.594	66.745	67.896
60	69.047	70.197	71.348	72.499	73.650	74.801	75.951	77.102	78.253	79.404
70	80.554	81.705	82.856	84.007	85.158	86.308	87.459	88.610	89.761	90.911
80	92.062	93.213	94.364	95.515	96.665	97.816	98.967	100.118	101.268	102.419
90	103.570	104.721	105.871	107.022	108.173	109.324	110.475	111.625	112.776	113.927

STATUTE MILES TO INTERNATIONAL NAUTICAL MILES

Statute miles	0	1	2	3	4	5	6	7	8	9
0	0.000	0.869	1.738	2.607	3.476	4.345	5.214	6.083	6.952	7.821
10	8.690	9.559	10.428	11.297	12.166	13.035	13.904	14.773	15.642	16.511
20	17.380	18.249	19.118	19.986	20.855	21.724	22.593	23.462	24.331	25.200
30	26.069	26.938	27.807	28.676	29.545	30.414	31.283	32.152	33.021	33.890
40	34.759	35.628	36.497	37.366	38.235	39.104	39.973	40.842	41.711	42.580
50	43.449	44.318	45.187	46.056	46.925	47.794	48.663	49.532	50.401	51.270
60	52.139	53.008	53.877	54.746	55.615	56.484	57.353	58.222	59.091	59.959
70	60.828	61.697	62.566	63.435	64.304	65.173	66.042	66.911	67.780	68.649
80	69.518	70.387	71.256	72.125	72.994	73.863	74.732	75.601	76.470	77.339
90	78.208	79.077	79.946	80.815	81.684	82.553	83.422	84.291	85.160	86.029

FEET TO METERS

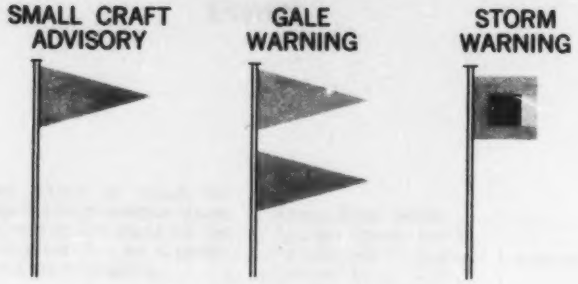
Feet	0	1	2	3	4	5	6	7	8	9
0	0.00	0.30	0.61	0.91	1.22	1.52	1.83	2.13	2.44	2.74
10	3.05	3.35	3.66	3.96	4.27	4.57	4.88	5.18	5.49	5.79
20	6.10	6.40	6.71	7.01	7.32	7.62	7.92	8.23	8.53	8.84
30	9.14	9.45	9.75	10.06	10.36	10.67	10.97	11.28	11.58	11.89
40	12.19	12.50	12.80	13.11	13.41	13.72	14.02	14.33	14.63	14.93
50	15.24	15.54	15.85	16.15	16.46	16.76	17.07	17.37	17.68	17.98
60	18.29	18.59	18.90	19.20	19.51	19.81	20.12	20.42	20.73	21.03
70	21.34	21.64	21.95	22.25	22.55	22.86	23.16	23.47	23.77	24.08
80	24.38	24.69	24.99	25.30	25.60	25.91	26.21	26.52	26.82	27.13
90	27.43	27.74	28.04	28.35	28.65	28.96	29.26	29.57	29.87	30.17

METERS TO FEET

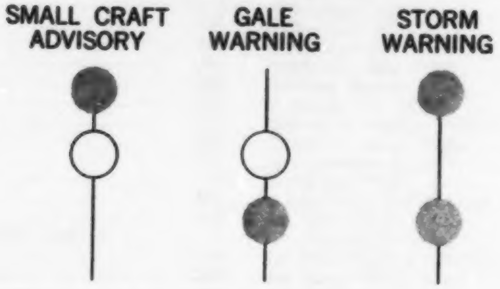
Meters	0	1	2	3	4	5	6	7	8	9
0	0.00	3.28	6.56	9.84	13.12	16.40	19.68	22.97	26.25	29.53
10	32.81	36.09	39.37	42.65	45.93	49.21	52.49	55.77	59.06	62.34
20	65.62	68.90	72.18	75.46	78.74	82.02	85.30	88.58	91.86	95.14
30	98.42	101.71	104.99	108.27	111.55	114.83	118.11	121.39	124.67	127.95
40	131.23	134.51	137.80	141.08	144.36	147.64	150.92	154.20	157.48	160.76
50	164.04	167.32	170.60	173.88	177.16	180.45	183.73	187.01	190.29	193.57
60	196.85	200.13	203.41	206.69	209.97	213.25	216.54	219.82	223.10	226.38
70	229.66	232.94	236.22	239.50	242.78	246.06	249.34	252.62	255.90	259.19
80	262.47	265.75	269.03	272.31	275.59	278.87	282.15	285.43	288.71	291.99
90	295.28	298.56	301.84	305.12	308.40	311.68	314.96	318.24	321.52	324.80

NATIONAL WEATHER SERVICE COASTAL WARNING DISPLAYS

DAYTIME SIGNALS



NIGHT (LIGHT) SIGNALS



Note: Shaded area represents the color RED on flags and lights.

EXPLANATION OF DISPLAYS

SMALL CRAFT ADVISORY: One RED pennant displayed by day and a RED light ABOVE a WHITE light at night, to alert mariners to sustained (more than two hours) weather or sea conditions, either present or forecast, that might be hazardous to small boats. The Small Craft Advisory relates to conditions within 5 miles of shore. Mariners learning of a Small Craft Advisory are urged to determine immediately the reason by tuning their radios to the latest marine broadcasts. Decision as to the degree of hazard will be left up to the boatman, based on his experience and size and type of boat.

The threshold conditions for the Small Craft Advisory are usually 18 knots (21 mph) of wind (less than 18 knots in some dangerous waters) or hazardous wave conditions.

GALE WARNING: Two RED pennants displayed by day and a WHITE light ABOVE a RED light at night, to indicate that winds of 34 to 47 knots (39 to 54 mph) are forecast for the area.

STORM WARNING: A single, square RED flag with a BLACK center displayed during daytime, and two RED lights at night, to indicate that winds of 48 knots (55 mph) and above are forecast for the area. (This is the maximum warning; hurricane warnings are not issued for the Great Lakes).

NOTE: SIGNALS ARE DISPLAYED DURING THE GREAT LAKES BOATING SEASON (APR. 1 - OCT. 31)

These signals are displayed at stations indicated by this symbol on the charts:
○ NWS SIG STA (formerly W B SIG STA)

NOTICE: The National Weather Service issues a SPECIAL MARINE WARNING BULLETIN whenever a severe local storm or strong wind of brief duration is imminent, and is not covered by existing warnings or advisories. No visual displays will be used with the Special Marine Warning Bulletin; boaters will be able to receive these special warnings by keeping tuned to a NOAA VHF-FM, Coast Guard, or a commercial radio station carrying marine weather.

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(4-82)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

COAST PILOT REPORT

PLEASE MAIL TO:

Director, Charting and Geodetic Services
Attention: N/CG223
National Ocean Service, NOAA
Rockville, Maryland 20852

This record of your experience and observations when coasting, entering port, and/or following inside channels will be used to correct, amplify, or confirm the description now given in the Coast Pilot.

Your cooperation is voluntary.

Please use additional sheets if more space is needed.

Additional report forms will be provided upon receipt of each report.

GEOGRAPHIC LOCATION

LATITUDE

LONGITUDE

CHART NUMBER

COAST PILOT NUMBER

VESSEL

MASTER/COMMANDING OFFICER

DATE OF OBSERVATION

OBSERVER

I. LANDMARKS: Mention those visible from seaward and useful for navigation (day and/or night); include natural ranges and indicate the pair of marks forming a range. Photographs of landmarks difficult to describe are solicited; each view should be labeled with the distance off and the direction towards which the camera was pointed.

TYPE	CHARTED		LATITUDE	LONGITUDE	DESCRIPTIVE INFORMATION HELPFUL IN IDENTIFICATION
	YES	NO	(Approximate)		

II. RADAR: List best radar targets and, if known, give maximum useful radar range at which the object can be positively identified and used. Mention under remarks places you have observed radar returns to be misleading.

NAME OR TYPE OF FEATURE *(Include approximate latitude and longitude if necessary to identify on chart)*	MAXIMUM USEFUL RANGE

III. ROUTES: Where entrance and inside routes are not marked by aids to navigation, show recommended directions for Coast Pilot (latitude and longitude of entrance point, and distances and true courses made good); include natural steering ranges if available.

IV. DANGERS: Mention those of concern to the navigator where special caution should be indicated in the Coast Pilot.

V. CURRENTS: Indicate places you have experienced conditions of current where special caution should be mentioned in the Coast Pilot.

VI. ANCHORAGES: Mention best anchorage in the area and other secure anchorages having good holding ground.

LOCATION *(Include anchorage bearings and natural ranges if available)*

TYPE OF BOTTOM OBSERVED:

	EXCEL	GOOD	FAIR	POOR	COMMENT
HOLDING QUALITY					
PROTECTION OFFERED					
ACCESSIBILITY					

RECOMMENDED FOR VESSELS:

LENGTH	DRAFT
____ TO ____ FT.	____ TO ____ FT.

VII. REMARKS:

VIII. OTHER COAST PILOT CHANGES

U.S. COAST PILOT

NUMBER	EDITION	PAGE	LINE(S)

NOTE: Any chart(s) submitted with your report to show conditions will be replaced free of charge.

READ: STRIKE OUT: INSERT AFTER: *(Circle one)*

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